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Widening Women's Work in Information and Communication Technology

Professional trajectories and biographies

WWW-ICT
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Introduction

This is a summary analysis of the biographical interviews conducted with 107 women and 33 men working in the ICT sector in seven European countries – Austria, Belgium, France, Ireland, Italy, Portugal, and the UK. Our analysis combined two strategies – to on the one hand preserve the biographical aspect of informants' narratives and to on the other hand look at more general patterns across individual biographies. Accordingly, the report is organized in five sections:

- We first present the major findings of the biography part of the WWW-ICT project, based on the seven national reports on professional trajectories and biographies. We searched the life stories for experiences that cut across the 107 female biographies. They allow a more general view of women's situation in ICT, namely of the diversity of backgrounds and career paths, of jobs and working conditions in the field, and the role of gender.
- Follows a detailed description of our informants, their background and their work experiences, based on a set of key data as well as on the coded narrative interview material. We combined a descriptive analysis of these data with a cluster analysis revealing particular *career patterns*.
- The third section presents what we call *life story patterns*. We arrived at these patterns by working with the narrative material, analyzing the individual life stories, looking for 'life themes', turning points, and strategies.
- Men's biographies are analyzed separately. We tried to read them in comparison to those of the women, looking for similarities and differences. Given their small number (33), the possibilities for doing such a comparative analysis are limited.
- The tables as well as the seven national reports on professional trajectories and biographies are to be found in the Annex.

Method

The aim of a biographical interview is to develop an understanding of a person's biography or trajectory – her development as based on opportunities, choices, and individual coping strategies.

Crucial concepts are:

- *Developmental tasks* that pose themselves in particular phases of one's life and/or in particular professions/work organisations (e.g. juggling the demands of work and private life, planning a step in one's career)
- *Individual coping strategies* in relation to given structures – enabling factors and constraints
- *Detours and their implication* for the person's biography – paths in a career that a person takes in order to prevent exclusion, find new points of entry, avoid exposure to particular expectations, etc.

- *Transitions* – changes of field of work, occupation, life situation, etc. that allow a person to redirect her biography, define new challenges, find better opportunities, etc.
- *Life themes* (Thomae 1996) – topics that emerge in the women's own accounts as crucial for understanding their choices

The focus of our interviews was on the women's work biographies, with an understanding that these are inseparable from their identity and concept of a good life. Silvia Gherardi's narratives of "women travellers in a male world" come closest to this notion of biographical interviews, the concepts that shaped her reading of the women's narratives being "the presence of a common plot, the outsider, the journey, the unexpected encounter with the different" (Gherardi 1996, p. 190).

The most common method for unravelling biographical information is the narrative interview. Although parts of the interview may be pre-structured, in particular those that concern information about the cornerstones of a person's biography, most of the interview is conducted in an open way. They are what Flick 1995 calls episodic interviews with a strong narrative character. The main idea is to stimulate a person to tell "stories" – significant episodes in her life that illustrate the whys and hows of important events in her biography and the role of relevant others in these events. Normally the interviewee covers several topics in her narration in her own sequence.

A good narrative interview also allows for a certain amount of reflection, supporting a person to remember, to make connections, to evaluate, regret or rejoice. The role of the interviewer is to stimulate, listen, and eventually suggest additional topics that help cover all the relevant points in the interviewee's biography.

We agreed on a set of criteria for selecting interview partners:

- Covering all ages, not only young workers
- Covering all levels of qualifications, not only highly qualified workers and a variety of job profiles
- Considering a diversity of firms (small as well as large companies)
- Covering a diversity of status (salaried, self-employed, full-time, part-time, etc.)
- Covering city and countryside as well as different regions (in the Italian case, both the North and the South; in the French case Ile de France, Picardie and Limousin).

The idea behind conducting interviews with a small number of men (five in each country) was to pair at least some of the profiles (as defined by age, qualifications, job category, employment status), looking for similarities and differences.

Conclusions from the biographical interviews

This chapter presents the major findings from the seven national reports on biographical interviews, discussing them in the light of previous research described in D1 'Conceptual framework and state of the art'. The joint set of conclusions takes account of the great diversity of biographies and their (national, cultural) context but also looks at common patterns. We focused on female informants only, also included is a description of tasks and skill profiles, based on the biographical material.

Background and the influence of the family

- The assumption that attachment to computers begins at an early age does not apply to our sample of women. There are several stories of informants having liked tinkering, using tools, and preferring technical toys as young girls. Especially among Italian informants there are several who mention early interest in computers and parents offering them a computer as a present. But the majority of informants did not get in touch with computers at an early age.
- Some women received special encouragement from their parents to go into the sciences and technology. Often it was the father's scientific or technical background or interest, who strengthened informants' affinity to technical things. In these cases the father (in some also an older brother) was a an important role model. Some fathers had attractive jobs, such as architect or industrial designer.
- There are numerous cases of women (especially in Austria and in the South of Italy) whose mother had a strong influence on the daughter's personal development and career choice. These mothers are described as role models – strong, admirable, and supporting, expecting their daughter to be strong and independent. These mothers' backgrounds differ – some are teachers, others homemakers, and only a few work in the area of math/science, 'naturalizing' mathematical and/or technical skills. There are several cases of mothers who run their own business, representing a strong incentive for their daughters to get independent. This resonates with research stressing the importance of the mother as a role model and source of encouragement for girls (e.g. Huang et al. 1999, Hapnes/Rasmussen 2000).
- There are also family circumstances that do not remotely signal a career in ICT. In many cases the fact that parents encouraged their daughter to make their own decision, respected their choice and trusted in it was mentioned as the most important support. Families often passed on to their children the importance of getting a good education and to be able to maintain themselves. In a few cases (in Belgium) informants had to fight against the expectations of their family to enter a more traditional career.
- Some informants come from backgrounds with limited educational ambitions and opportunities (rural, ethnic). They enter ICT through indirect routes, work in related areas or auxiliary professions, and use ICT to break out from a narrow path.

The influence of the school

- Some, but not all, of our informants excelled in math and/or the sciences. In the UK, a considerable part of women with careers in ICT comes from all female secondary schools.

In countries such as France school grades are important in regulating access to a career in science/technology.

- Teachers were influential only in a few cases. Then it was the math teacher who opened informants' eyes to computing as a career option.
- Some of our older informants went to school at a time when no computers were available, and in many cases first contact with ICT was at university level. Some of the younger women had computers at home, provided by the father, an older brother, in a few cases the mother, or they bought one from their pocket money.
- There are very few stories of negative experiences in school, of being confronted with gendered attitudes. Though, some of those informants who went to a technical secondary school, mention the strange experience of being one of a few girls.

Personal attributes – relationship to ICT

- Many of our informants report to have been determined to overcome difficulties from an early age on and they like to solve problems. Some describe themselves as fighters against difficult odds. Some of the highly successful women characterize themselves as shaping their own environment. They are ambitious but also engaged, critical, and self-conscious, defining themselves through what they accomplish in their work. They like ICT, often the purely technical side of it, because it requires problem solving and giving shape to a solution. Another part of the successful women embarked on a straight career in ICT and strive to the top, accepting the tough conditions – hierarchical structures, stress, competitiveness, sometimes even fighting.
- Technology, in particular ICT, is attractive to a large part of our informants, for several reasons:
    - It is challenging work, offering the opportunity for learning and perfection, and for being creative.
    - It is fascinating, satisfying the urge to "solve riddles and generally the curiosity to get to the bottom of things".
    - Being able to work with customers, translating their needs into software or a web site – this may even include a care-taking aspect.
    - It is an open world, with a wide horizon.
    - It offers jobs in a respectable area and status.
- Even those women, who have left the ICT sector maintain this positive relationship to ICT, either teaching ICT skills or creating their own web site.
- "Assimilation of informatics with technology, mathematics and physics" (D1, p. 56) is not a disadvantage. For many of our informants ICT is attractive precisely because it requires analytical and problem solving skills and they experience this as a source of creativity. There seem to be two major entry routes in ICT for women, either through mathematics and the sciences, or through an application area. Different types of girls benefit from different approaches to teaching ICT skills – a more mathematical one or one based on software packages (D1, p. 78f.).

- We did not find evidence of women contextualizing their interest in computers in other areas such as medicine (Margolis et al. 2000) or of appreciating computers via the contributions to society they make (D1, p. 71 and 99). However, a few informants distanced themselves from the love stories some of their male colleagues have with computers.

Entry routes into computing

- Entry routes into computing are diverse and, as mentioned already, early contact with computers is not a determinant in choosing ICT as a career. Many informants learned to use a computer rather late and most of them used a variety of resources to acquire the necessary skills – from formal school-based training to learning on the job and complementary special training courses. The great diversity of entry routes into computing confirms the need for innovative cross-disciplinary curricula (Cedefop, 2001).
- Most of our informants had their first job in the ICT sector. 20 (of 107) women studied informatics at the college or university level (computer science, information sciences, software engineering, information systems), some in combination with management, and some have degrees that include some informatics (e.g. cryptography). Another frequent route into computing is (technical) mathematics. To those who love math and analytical thinking a job in computing offers something applied and practical. A series of informants chose subjects that would lead obviously into computing and ICT work, such as physics. A strong interest in electrical engineering, as in the example of a woman fascinated by robotics, is rare.
- Other informants have degrees in other subjects, such as economics, journalism, marketing, chemical engineering or biology, and environmental studies. Some of our informants have a background in art, graphic design or journalism which they later combine with ICT into successful careers as illustrators, digital graphic designers and web designers.
- There are several cases of women working in tourism, regional planning or graphic design, who discovered the Internet and web design. These women developed their skills either by self-learning or by attending a training programme. There are a few cases (in France) of informants for whom Internet and web design skills offered the opportunity to invent their own area of expertise and job in their work organization.
- Another part of the women followed a work-based route into ICT, from secretarial or clerical work, tourism, librarianship or accounting. Several women started out as teachers of math, history, accounting or adult teaching. A common career step is to move from more technical work, including project management, into marketing and customer-relationships.
- There are also some examples of women who drifted into computing by chance, having eliminated other choices and learning about ICT in one or another way. In some cases it was an internship or temporary employment that brought them into contact with ICT.
- For some women computer science is a "ticket to economic opportunity". This holds true in particular for women living in economically deprived regions and women with an ethnic background and has been described by Margolis et al. 2000 (D1, p. 76). Some of the informants from Italy, for example, motivate their choice of ICT with the job opportunities in the field. Getting an education in engineering and ICT is seen as the most

reasonable way to optimize their chances on the labour market. Job security is a strong consideration especially for women from the South.

Job histories/trajectories

- As the women entered ICT through a wide variety of routes and occupy a diversity of jobs, there are no clear-cut trajectories.
- The majority of informants have technical careers, starting, for example, in software development and processing to the position of team leader or entering management. Others work in operating or support functions. There are also several careers in management and marketing, starting from assistant positions with managerial tasks. Some women entered a university career or work in research institutions.
- Careers in web design and Internet journalism (14 of 107 informants, two of them team leaders and one web design manager) differ from those in software development. They are easier to enter, because they are less technical, with skills in areas such as journalism or graphic design serving as entry points. They are much more restricted as regards skill development and career options.
- A number of women have what we call 're-orientation careers'. They typically felt that their present work did not offer enough challenges and opportunities for learning and, while e.g. looking for additional training, discovered ICT. A large proportion of those who entered ICT from other professions or fields of work had several jobs before.
- In some countries (notably Portugal and France), women's job histories are not a result of a conscious career choice but of following the opportunities that present themselves. The women engage in an extended period of search, moving through several small jobs, before they start constructing a career.
- Careers in large organizations – 51 of 107 informants work in organizations with more than 100 employees – differ markedly from those in small or middle-sized ones. Large organizations have a strongly-developed internal labour market. Openly advertised job opportunities and a wide pool of jobs to apply for have been a key to the development of women who work in such organizations. What keeps women in these organizations is the opportunity to always do new things in different fields and with different people.
- Smaller companies – 31 of 107 informants work in organizations with less than 100 employees, some of them very small companies – offer the possibility to acquire a broad range of skills through learning on-the-job. Hierarchies in these companies are rather flat and there is a limited range of jobs and areas of expertise available. A career here means to move on to other companies and types of work.
- Within the software industry, inter-company mobility is seen primarily as a way of acquiring new knowledge, of increasing one's experience and grow in one's profession. When we look at women's careers within the ICT sector, 45 have their career within one company (some of our informants are too young to have had the opportunity to move on), 24 have changed company within the sector once, and 38 several times. Although "nomadic careers" (D1, p. 59) are not the norm in ICT today, there is some evidence of successful women in the field changing company, also several times, in order to broaden their opportunities. Living in a metropolitan area with a large and diverse labour market (such as e.g. in Milano, London or Dublin) facilitates inter-company mobility.

- We also have some examples of broken careers, with women suffering from the fact that they have not finished their degree or of few and limited job openings in the region or they find out that ICT is not the field they want to stay in. This experience is sometimes coupled with the feeling of failure and lack of courage.
- Especially among the younger of our informants, careers are still open. They had a good start in working life, love their job, and are hard-working. But they are considering other attractive options such as continuing their formal education, going into marketing or training or even more remote alternatives (e.g. artistic ones).
- Although the women in leading positions in general like their work, are ambitious and see themselves as successful, there are a few cases, four of them from the UK, in which several negative characteristics coincide. One woman, of Asian origin, works as a director of information and technology services in an international catering association. She has enormous difficulties in organizing child care and gives a rather negative evaluation of her work situation – low pay, lack of support, high levels of stress, high work loads as well as the lack of career possibilities. She does not feel too comfortable with ICT and would like to change employer/job. Another UK informant, whom we described as 'struggling', embarked on an impressive research career after an extremely difficult start in life, but is very unhappy with her situation at university, feeling mobbed. A third one, general manager in a software company, left her career as a history teacher, which she still sees as her 'real' career, out of the need to earn money. A Portuguese woman with a good career in a large international computer company, feels in the right field but complains about high levels of stress, high work loads, role overload, and having to be totally available. One of the Irish informants is a successful manager but expresses that the (right) choice of a family has somehow compromised her career. She also complains about the lack of support, a high level of stress, and the lack of career possibilities.

Self-employment as a strategy

- Several of our informants are or have been self-employed, building their own software house, web agency or training academy (and some consider this as an option). The main motivation of these women is to shape their own work environment and to be their own boss.
- There are two Austrian cases of 'university spin-offs' where the women (in one case together with a male colleague) took a particular software product as the basis for founding a company, the main idea being to further develop and sell the product and to carry out projects in cooperation with industry. In both cases special loans and counselling were available. One of the women acts as director of finances and software development while her associate is responsible for project acquisition. The other woman kept her university employment. She describes herself as the 'technical mastermind' of the company which is managed by her brother. Both women have a strong computer science background.
- There are several cases of women who have founded a web agency together with their husband or father. Their roles vary. A French woman with a background in law and experiences in a series of jobs in the political administration bought a web agency together with her husband. Each of them has their own clients and is responsible for project acquisition and management. In the case of a woman with a background as laboratory technician and some ICT skills, it is the husband who directs the group which their small

web agency joined and who is responsible for project acquisition and programming, while she took over the administrative tasks including the web. In another case it is the father who helped his daughter set up a web agency together with an associate partner who is responsible for the technology while she takes care of the rest, including HR. The young woman has some management skills but no degree.

- Another structure is that of a company within a company, such as in the case of a Belgian woman with a strong background in computing, who first went freelance in order to be able to spend more time with her children and now owns and manages an independent development team of 12 (male) employees within a company "as a good mother".
- Several of our informants work as freelancers, for a variety of reasons. For those with a background in art, journalism or graphic design it is almost a 'natural' solution. They have built good relationships within the designer community and can make a living. In other cases going freelance offered the opportunity to have more flexibility and time for children and family. We did not find evidence of "blurring boundaries" between employees and independent employment though (D1, p. 59).

Tasks and skills

Our findings largely confirm the job profiles defined by *Career Space*. The more detailed job descriptions that we extracted from the biographical material emphasize the importance of solid technical skills for good jobs in the ICT industry, including project management (D1, p. 110). They also describe the relevance of non-technical skills. None of our informants works as a system architect or chief developer.

- *Network administration*: This is a low level job in the ICT sector, requiring occupational training but not necessarily a degree. Network administrators have to know how to set up, configure, and maintain a network (on a Linux or Windows basis), install software on computers, define and handle policy issues, make back-ups (or even provide a solution for back-ups), and handle break-downs.
- *Development*: Developers do the programming of software, on different levels of technical complexity. For this they need to know several programming languages, be able to learn new ones quickly, be able to work on different platforms, and use a wide range of development tools. Even when working on a well-defined and limited task, programming is not completely routine and often requires finding a solution to a specific problem. Programming tasks may range from databases, to user interface design, to business processes. The work of developers may include writing up a specification, finding a solution to a specific request from a client, searching for errors and handling them, software maintenance and trouble-shooting. Developing may require working in the client company.
- *Project management*: There are several levels of responsibility within project management.
    - At a lower level managing means being the leader of a small team in charge of a specific set of tasks. The team leader communicates with the overall project manager, articulates open questions and problems, explains and distributes tasks, and helps team members to find a solution. Team leaders may have to define milestones and detailed specifications, review and integrate the technical

documentation, and implement configuration and change management procedures. They may be in contact with the client organization.

  - At a higher level project management includes project acquisition – to negotiate and specify requirements with the client organisation, carry out a feasibility study, make a cost estimate, and write up a project offer. A project manager cooperates with technical specialists in the team or a technical leader in defining work packages, tasks, and dependencies. S/he has to draft a detailed work plan, distribute tasks, define milestones, schedule and re-schedule tasks, and assess project progress. Project managers typically act as boundary spanners between team and client, organizing presentation meetings with clients, negotiating requirement changes and communicating them to the team. They are responsible for their project budget, the quality of the product, timely delivery, and project documentation.

- *Project communicator*: The project communicator acts as a boundary spanner or mediator between a) people in a development team (e.g. graphic designers and programmers), b) developer and client organization (e.g. talking to clients about needs, products, and solutions), and c) project partners (in the case of cooperation projects involving several networked companies). The role of communicator may include designing marketing strategies, participation in project/client acquisition, (participation in) proposal and report writing, project presentations (e.g. describing the product for users), and research (looking for new or similar products, development tools, etc. in the Internet). This role can be performed on varying levels of competence and responsibility. For example in large companies it includes management responsibilities.
- *IT management*: IT managers typically are leaders of a department. They are responsible for the organization of work within the department, sometimes including human resource management, for planning, budgeting, and implementing projects, and for reporting to top management. Within IT managing a department may require to build up competencies and teams in new application areas (e.g. Enterprise Resource Planning, e-commerce, e-learning, Manufacturing Execution Systems) and/or to organize the transition to a new technical regime (e.g. from single applications to integrated systems, from host to client-server solutions). In some cases they are in charge of maintaining client relationships.
- *Sales and marketing*: Those computer specialists who are in charge of customer relationships with business accounts (big enterprises/organisations or SMEs). They are responsible for negotiating the design process of hardware and software solutions to be developed by their company for their business clients, to follow the process of design and implementation as commercial supervisors, and to manage the practical aspects of the contracts between providers and clients. Practically, these occupations do not include sales persons in the computer shops. But, to some extent, they may include commercial agents of hardware manufacturers.
- *Customizing*: Those occupations concerned with adaptation and customisation of software packages according to the specific features of the enterprise or organisation where the package has to be implemented. This kind of job is most frequently related to software packages such as ERP (SAP and others), CRM packages, platforms of e-commerce, etc. It also exists for "sectoral" software packages, such as banking software, travel agency software, etc. The job includes a mix of programming tasks (more exactly

parameterisation of existing programmes), definition of functional specifications, relationships with the users for translation of organisational needs into parameters.

- *Multimedia production*
  Depending on the size of the company, there is an overlap of roles and tasks, with the resulting hybrid job profiles. Moreover, small companies tend to outsource the more technical tasks, concerning e.g. system architecture, hardware configuration, and database connections, to external partners.

    - *Web graphic designer*: These are people responsible for the media-specific design of a web site. They need to combine skills in graphic design (this may include an artistic aspect) with knowledge of the rules of web design, including its technical implementation. Web design requires negotiating the design with web developers/programmers and being able to define technical details of the implementation. Web design includes some (HTML, flash script, etc.) programming.
    - *Web production manager*: Web production managers combine classical management skills with special knowledge of multimedia production. They are responsible for marketing, project acquisition, project planning, budgeting, quality control, and timely delivery. In small companies they may have to be competent web graphic designers being able to define a design concept and review designs.
    - *Web publisher/content strategist/information specialist*: These are people responsible for concept design (this includes content and navigation). They create scenarios and define the content of a web site. This requires journalistic skills and experiences.
    - *Internet journalist*: The basis of the work of Internet journalists are journalistic skills, mainly interviewing, research, and story writing. The work of editing information in the Internet is often supported by special authoring software, including Photoshop. It consists of editing text and images and making links to other web sites.

Organization of work

- Work in ICT is organized in the form of projects. There are few examples of solitary work, as most work in software development and web design is team-based. Whereas in web design this reflects the need for a variety of skills – graphic design, programming, content production, video and sound, etc., work in software development is based on a well defined division of labour. Depending on the system's architecture, different sets of functionalities are distributed to different modules, with defined interfaces, and different teams being responsible for the development of those modules. In large projects, tasks such as testing and system integration (re-composition) are carried out by specialists. Despite of this division of labour, developers need awareness of the overall project design and arch of work to be able to do their work.
- Being part of a software development team requires to cooperate and align the work with others, distributing tasks, discussing coding practices, producing and controlling bug reports, change requests and design changes, and creating and managing different versions of a system. This also implies helping each other when it comes to special problems

requiring a particular skill. Teamwork is a genuine practice in software development and not just, as argued by the FLEXCOT project "a rhetorical and motivational tool" superimposed on a reality of "very narrow, repetitive series of tasks" (D1, p. 51). We did not find evidence of a tailorized work organization in our informants accounts of their work.

- There are two types of teams to be found in ICT work: (i) teams in which members have complementary skills and collaboratively work on a common task; (ii) teams where people work independently but have to align their work with the work of others.
- Being a member of a good team is an important experience and also value for our informants. They not only enjoy the personal side of working with friendly and supporting colleagues but also appreciate the support they get in a good team for creating a high quality product and for developing their own skills. This resonates with the findings of Von Hellens et al. (2000 and 2001) that women ICT professionals see the mix of technical, human and organisational skills as the most positive aspect of computing (D1, p. 86f.).
- In particular in the smaller companies, there is a limited internal hierarchy. Companies emphasize the need for self-management and responsibility. In the foreground are the quality of the product and the meeting of deadlines. Most of our informants appreciate the space that this gives them in how they and their team organize their work. Managers are visible and close. As a few cases show, a negative personal relationship can lead to the decision to leave a job.
- Our findings do not allow to distinguish between large and small organisations as offering more or less opportunities for women, as suggested by previous research (D1, p. 61 and p. 87).
- There are several examples of company take-overs, outsourcing, and organizational restructuring. Some of the informants who have experienced this have found their age to be a major factor in their vulnerability to redundancy (notably in the UK). In general, the de-localisation of work "from 'core' organisational premises to back offices, call centres, offshore facilities and remote subcontractors" is not as widespread as suggested by recent European socio-economic research, nor is teleworking (D1, p. 51).

Working conditions

- People working in ICT have to cope with high workloads. In Belgium and the UK a large part of the informants finds long working hours a definite draw-back of jobs in ICT. In the other countries few informants complain about long working hours and stressful working conditions. This may be to do with the fact that many of our informants (34) are young and have no children. Only in some cases informants work long hours (50-60 hours) regularly. Overtime is in general not paid in the ICT sector.
- As found in several European research projects (D1, p. 44), working time arrangements are in many cases rather flexible (52 of 107 informants), hence individualized, and there is a tacit, unspoken agreement to balance long hours versus the flexibility to arrange them.
- Our findings do not confirm in general that "intensive rhythms of work, the overloaded schedules and frequent overlaps between professional life and private life, which often characterise the working conditions of ICT professionals, are very little attractive for

women" (D1, p. 59). To the majority of our informants applies what Gerwitz and Lindsey (2000) formulated: "They are willing to spend more time working if they can have flexible hours or work at home and have their success tied to performance rather than face time in the office" (D1, p. 129).

- However, long hours, including availability during evenings and weekends, are a problem for working mothers (in particular for those without a supporting partner) and few companies and/or colleagues generously adapt to the need to reduce or regularize working hours when children are young.
- Moreover, in the ICT sector it is difficult to get part-time work accepted. For the women who negotiated a part-time arrangement, this often does not have an effect on their overall workload but negative consequences for their salary and their career.
- The pattern and rhythm of work is dictated by project deadlines (sometimes aggressive ones) and emphasis is on completion of work (rather than on hours). Also working directly with a client creates special commitments and the need to be available. This applies in particular to support work. ICT work is often unpredictable, due to the fac t that requirement have not been well defined and/or are changing and evolving over the course of a project. Additional pressure is created by the fact that
- There is a difference between the older, more stable companies and start-ups as regards working hours, with the latter strongly relying on the willingness of people to cope with excessive demands. Women working in very small companies and as freelancers describe "working like mad" as the normal and (in general) accepted situation.
- For our informants it is not uncommon to work at home during evenings or weekends, e.g. when the children are in bed, either reading e-mails and continuing an unfinished job or working on a training programme.
- In particular in the area of web design and project management there are cases of women reporting not being paid adequately in relation to their competences, responsibilities, and workloads. Complaints about inadequate salaries are particularly frequent in Italy (6 cases).

Private situation

- 79 of our female informants live in a partnership and only 43 have children. Of the 38 informants who are young (up to 30) 34 have no children. There are examples of women (e.g. in Belgium) who are divorced and with several children. For them managing timetables is extremely difficult. One woman consultant who needs to travel a lot abroad, is without children.
- In some countries (notably Portugal and France), the women are mainly (and sometimes exclusively) responsible for the family and in these cases private life and obligations shape and limit their career paths. In France several informants followed their husbands, trying to find work in a field where they would not be an obstacle to his career.
- Informants from Italy with small children often have a good support network. Women who had the experience of maternity leave did not find it difficult to get integrated when returning to work. For some, instead of representing an obstacle, maternity leave was a positive occasion for starting something new.

- Some of the successful women (notably in Austria and in Italy) have supporting partners who take over a major part of childcare and household responsibilities. There are a few examples of a partner encouraging the career of the wife in ICT.

Work culture

- Our findings do not support the view that women generally find hostile work environments in engineering firms (D1, p. 84). There are cases of supportive work cultures as well as those of exclusionary and unsupportive ones. No clear pattern emerges, with work cultures being organization-specific, location-specific, and even team-specific.
- As regards the unsupportive work cultures, there are some cases of women with children for whom the culture of the workplace (managers, male and female colleagues) makes their personal situation very difficult. Other negative experiences are related to company strategies, such as restructuring and outsourcing.
- 30 of our informants mention a mentor – a person whose influence and support has had a positive influence on their career. Female and male managers/bosses, professors, fathers, and older brothers acted as mentors. Their main role was to support the woman's career development, opening doors, suggesting career moves, and being supportive. There are several cases of women who were asked to follow their boss into a new project, a new area of work or new company (e.g. ITF14, ITF19, ITF20). AF13's mentor invited her to apply for a job in his company and helped her to negotiate a good salary and the job she wanted. In the case of IREF03 the manager of an IT department advised her to start an evening course and get a diploma and then offered her the opportunity to start work in the department before she had finished her degree. ITF14 first worked part time in her father's graphic art studio and, when joining a publishing company, met a famous art director "who was like a second father", acting as a mentor and teacher. FF03L is still in contact with professors at her university and in this way learned about a new educational programme in web design which radically improved her career. AF11 has a boss who encourages her and gives her the freedom to explore new areas of work. There are two examples of even more significant support. ITF09, who is still very young and open, has an older brother who offered her to join his business activities teaching her the skills she needed to be a competent customer support person. FF05L is very close to her father, who influenced her career choices, opened doors to employment, and helped her set up her own web agency. They are currently planning a joint venture.

Gender issues

- Women tend to deny discriminations and difficulties unless they become evident. However, 30 women report feeling disadvantaged and 28 talk about being faced with prejudices, to 18 out of these women both applies. There are cases of 'sexist and racist humour' to which our informants react in different ways, sometimes also addressing them openly.
- In some companies there is a gendered division of labour, in particular in the lower hierarchy jobs. There are gendered lines between development and network-related tasks, most pronouncedly in the telecommunications industry, which has its roots in electronic engineering. These lines also seem to be more pronounced in web agencies and in multimedia companies, where the more technical jobs (programming) are almost exclusively done by men. In software development there are some cases of women who

are not included in project acquisition activities, e.g. in cooperation projects with industry, assuming customer prejudices against women. This is a clear disadvantage for them. Although balances between technical and non-technical tasks may be gendered, the gendering of work in the ICT sector is not as marked as suggested by previous research (D1, p. 84f.).

- Among some of the Austrian women in particular there is a high awareness of gender issues and these women engage in activities supporting women in the field, for example training courses.
- There are women who enjoy working in (almost) male environments and who feel that they even benefit from their visibility. There is another group who feels uncomfortable in (almost) male environments. Furthermore, there is a difference between older women, who experienced a lot of hostility (when their numbers were increasing) at a time, when diversity was not contemplated, and younger ones whose technical background and competence and familiarity with male environments help them adapt and be accepted.

Training and learning, development and progression

- Learning is an integral part of working in software development and web design. The possibilities for training depend on the size of the organisation. Whereas big software companies, including banks, offer formal training programmes, small work organisations rely on self learning and peer group support. However, as a result of the crisis in the ICT sector, also the large companies reduced their budget for training.
- In small companies, the team and/or informal network of colleagues becomes the training ground, with people benefiting from informal coaching, from talks by team members, and from the many specialized web sites in their field. These kinds of learning are an integral part of the work and highly appreciated characteristic of a supportive work culture.
- Training is a scarce resource on the lower levels of the job hierarchy, more so than in the more qualified areas of work. The lack of training opportunities has in some cases become a critical issue for women who interrupted their career.
- Except in some of the very large companies, career advancements are based on individual performance and are individually negotiated. 20 women mention the lack of career possibilities in their company. These are women who work in web design, project management but also some women in leading positions. 20 informants do not feel sufficiently supported in their work.
- There are some cases of discriminatory development and progression practices (notably in the UK and Ireland).
- Women report on mixed experiences with e-learning, some are rather critical (Belgium), others positive (France).
- Providing training courses in ICT (for women) is an attractive career perspective for some of our informants.

A looking glass on women's biographies

This section presents findings which are based on a set of key data asked for in each interview on the one hand, the coding of the narrative interview material on the other hand (see Annex 2A for the key data sheet and Annex 2B for the coding scheme).
The coding scheme was derived from a first analysis of the interviews when we looked for patterns, not only within but across cultures, capturing common features as well as diversity and contrast in the material. Members of the national teams filled in the coding scheme for each informant. The scheme was organized in several broad categories (derived from the explanatory model described in D3) and contained both, pre-defined categories as well as open descriptions:

- Background (home environment, significant others, career choice, critical life events, etc.)
- Work history (ruptures/breaks, promotion, steps ahead, constraints, etc.)
- Current work (tasks/skill profile, quality of working conditions, workspace, cooperation at work)
- Cultural factors (gender, relationship to technology, etc.)

SPSS for Windows (release 11.0.1) was used for evaluation of key data sheets and coding schemes. We conducted a descriptive analysis, highlighting correlations based on hypotheses, and a cluster analysis. Table 1 gives an overview of the interviewees per country.

		country							Total
		A	B	F	IRL	IT	P	UK	
sex	female	15	15	17	15	15	15	15	107
	male	5	5	4	5	5	4	5	33
Total		20	20	21	20	20	19	20	140

Table 1: Number of female and male informants in each country

We first describe the sample of women using the key data to then present an analysis of the coded material. The final part of this section describes the career patterns we identified with the help of the cluster analysis. (The detailed data on key charachteristics and the varied profiles are presented in Annex 2C and 2D. In Annex 2E the data for the cluster analysis are provided.)

Key characteristics

Age, partners and children

The majority of women we interviewed are between 31 and 40 years old (see Table 2), the youngest is 22 and the oldest 55.

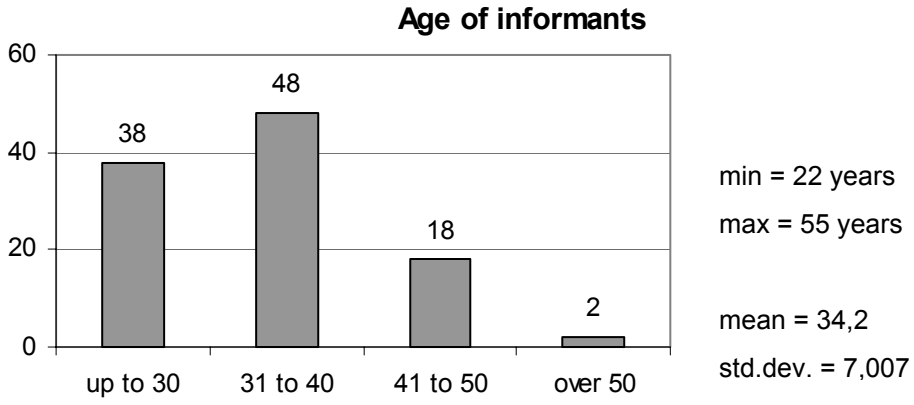
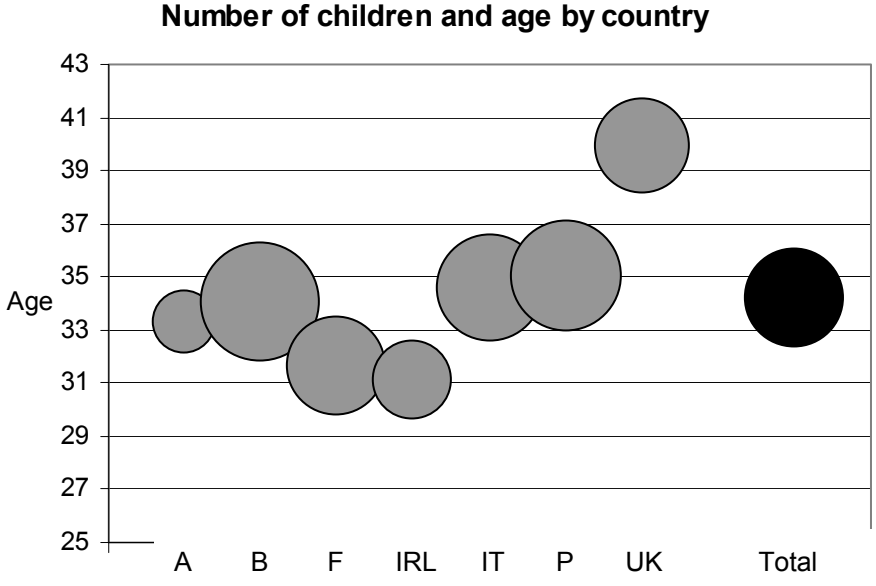


Table 2: Age of informants – frequencies, n = 106 women

79 (74%) of the 107 women live in a partnership. Only 43 (40%) of them have children. The overall average number of children is 0,69 but it differs notably from country to country. Differences between countries may have to do with the ways informants were selected. Table 3 shows the average age of the informants (height of the centre of the bubble) and the average number of children (size of the bubble) for each country. The age of informants is highest in the UK with 8 (of 15) women over 40, and two of them over 50. The number of children is lowest amongst the Austrian interviewees, with 11 of the 15 women having no children, and highest in Belgium and Portugal, with 8 women having children. Most women with children have one child (21 women) or two children (16 women). There are 6 women with three children – three of them live in Belgium, two in the UK and one in France.



	A	B	F	IRL	IT	P	UK	total
average age	33,27	34,07	31,59	31,07	34,60	35,00	39,93	34,20
average number of children (corresponding to the size of the bubble)	0,33	1,00	0,71	0,47	0,82	0,87	0,67	0,69

Table 3: Average age and average number of children in each country, n = 102 women

The low number of women with children could be explained by the low average age of informants. Most of the young women in our sample do not have children (see Table 4).

		3 categories of age			total
		up to 30	31 to 40	over 40	
number of children	0	34	18	8	60
	1	2	16	3	21
	2	1	6	8	15
	3		5	1	6
total		37	45	20	102

Table 4: Number of children by age, n = 102 women

Of the 43 women with children 32 have at least one child younger than 14. Numbers are highest in Portugal (7 women), Belgium and Italy (6 women each). Four of these women do not have a partner, 11 talk about sharing their responsibilities with their partners. In two Austrian cases the partner takes even more than 50% of the responsibility of looking after their child. In another seven cases partners help in the household but not with childcare. Finally, there are nine women who take full responsibility for children and household; five of them live in Italy. Apart from support from their partners, some of the women have nannies, occasional babysitters or domestic help, again mainly in the Italian cases. In five cases family members (mainly mothers and mothers-in-law) are mentioned as helping out with childcare.

Jobs, tasks and companies

Our informants work in many different jobs in ICT. They work in small as well as big companies on different levels of the hierarchy. Some are self-employed, some work in non IT companies but in IT jobs within an IT department of e.g. a bank or insurance company. To capture the diversity of jobs and tasks of our informants, the job titles they gave us together with a short description of the tasks (see key data sheet in Annex 2A) have been used to derive categories of jobs/tasks. These empirically grounded categories are by and large identical with those defined by *Career Space*. However, the narrative material allowed us to describe these job profiles in more detail (see section on conclusions).

We identified seven job profiles. Table 5 lists them in the order of frequencies:

Project management (26 informants): These women have a project management position or are head of a department, but do not have responsibility for personnel. Most of them (17 cases) work in large companies (companies with more than 100 employees); six of these women work in companies with less than 100 employees (small companies).

Developing (24 informants): Their work mainly consists of programming which sometimes also includes analysing and testing the software and/or quality assurance. One woman in this category works as a SAP consultant. Three women who do technical writing have also been included in this category. They write software documentations or educational content. Again most of the informants (14 women) work in large companies, five women work in small ones.

Leading position (19 cases): This category includes women in jobs with responsibility for personnel but also single-person companies. Typical jobs are director of information and technology services or general manager in a software company or technical sales leader. Six of the informants in this category hold a leading position in a large company, another four women have university careers (which was also categorised as a leading position in a large

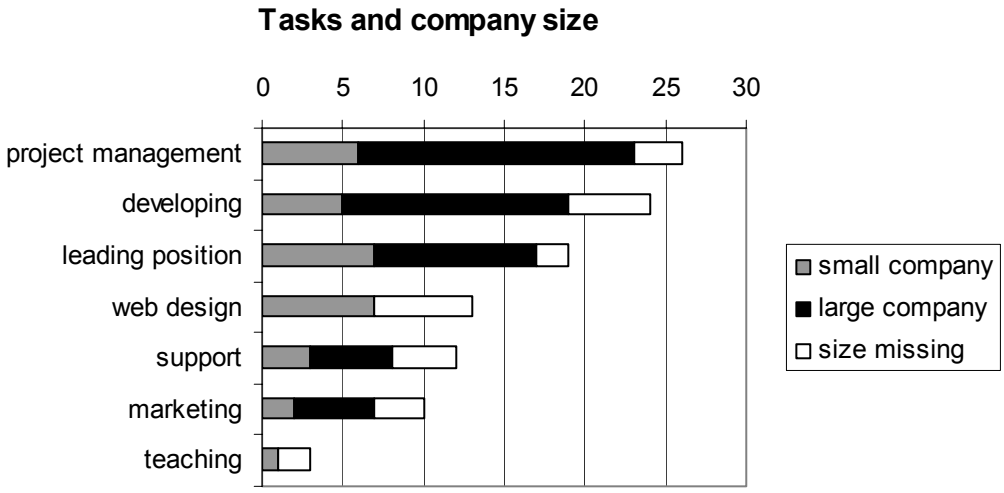
company). One of the women with a university position also has her own company. Seven of the women in leading positions work in small companies (with less than 100 employees). One of these women is self-employed as an independent IT consultant; four work in their own company, which they built and manage either alone or with an associate.

Web design (13 cases): They work as web designer (8 women) or as graphic designer (4 women) and Internet journalist (one woman), mostly in small companies (7 women).

Support (12 cases): These women do server/network administration or work as helpdesk operators. A common job title for these tasks is "IT specialist". Five of the women in this category work in large companies, three in small ones.

Marketing (10 cases): Marketing requires dealing with public and business relations, customer acquisition and sales. A common job title is "Product manager". Five of the women work in large companies, two in small ones.

Teaching (3 cases): Two of our female informants teach computer science (one in a private school, one in a secondary school, both in Italy). Another woman works as ICT trainer at a regional educational institute in France.



	small company	large company	size missing	total
project management + middle management	6	17	3	26
developing / programming	5	14	5	24
leading position / university + single-person company in IT	7	10	2	19
web design + graphic designer / Internet journalist	7		6	13
support / administration / helpdesk	3	5	4	12
marketing / public and business relations	2	5	3	10
teaching	1		2	3
total	31	51	25	107

Table 5: Tasks and company size (in the order of frequencies), n = 107 women

Eleven of our informants are *self-employed*; six of them have been categorized as having a leading position, one as project manager, and one as developer. The remaining three are in web design. Two of these eleven women work as independent IT consultants (one in the UK, one in Ireland who is currently unemployed). Four of the women work as freelancers, two of them in web design (they live in Portugal and Italy) and one is a digital visual and graphic

designer from Italy. One of the Austrian informants has organised IT training courses and seminars for women and is currently finishing her master thesis. Five women have founded their own company, either alone or with an associate, in two cases their husband. A Belgian woman set up a small development firm which has been taken over by another company. She acts as development team manager and has considerable autonomy in running her department. One of the Austrian informants runs a software company in addition to her university position and another one works as director of finances and software development in a company she co-founded with a male colleague. One French woman is head of her own company, another one co-manages an information and communication consultancy together with her husband who is in charge of technology and project acquisition.

Seven of our informants had left the ICT sector at the time of the interview[1]. One of the informants from the UK – she is 52 and took early retirement in 2001 – has worked as a systems batch analyst. Two women – one has worked as PC support in Belgium, another as an independent IT contractor in Ireland – are currently unemployed. Two of the Austrian informants are currently undergoing further education. One of them, who lost her job, follows a self-designed curriculum in "Intercultural IT management" with financial support from a foundation; the other one has gained a scholarship to finish her master thesis in journalism. Two of our informants have changed into a non ICT job. A former client/server development engineer now works as a primary school teacher in France; a former software developer from Ireland also moved into teaching. One of the informants from the UK works part-time as an "e-learning consultant" and part-time as economics professor in a superior school.

Not all the job categories are covered in each country. For example, the three women in teaching live in Italy in France. In all countries there are informants working in project management and in developing, except for the UK none of the informants work in developing and almost half of them in leading positions. Another five of the women in leading positions live in Austria. The women working in web design mainly come from France (5 cases) and Italy (4 cases). Support jobs are frequent among interviewees from Belgium (4 cases) and Austria (3 cases).

The majority of informants entered the ICT sector from the start. Of the 30 women who have worked in another area before moving into ICT, eight are French. A common pattern here was to first explore different (non ICT) jobs in the form of short internships. Interestingly, there are eight cases of women who first worked as teachers: one former maths teacher and one former history teacher in the UK; one Belgian woman who started out as an arts teacher in primary and secondary schools and one as a professor for accounting – she now works as an e-learning consultant in addition; and four of the Portuguese informants, among them a kindergarten teacher (in the US), a mathematics teacher, and an assistant professor of physics at a university.

Inter-company mobility within the ICT sector is rather low. 69 women changed their job/employer not more than once in their career – some of them are quite young. Altogether 38 women changed their job/employer twice or even more often during their career. Mobility is highest in Ireland and Italy, with 7 women in each of the these countries changing their job/employer twice or more often.

The companies in which the majority of our sample (41 cases) works are part of the ICT sector, in the areas such as software, consulting, system house or IT services. 15 women work

[1] The answers in the coding scheme apply to the last job in IT in these cases.

in web design companies, nine in companies with a focus on hardware, another nine in telecommunication companies or Internet providers. 13 women work at universities or in schools or other educational institutions. Finally, 18 women work in companies that are not part of the ICT sector and here in special ICT jobs or in ICT departments. This includes banks, insurance companies, political parties, trade associations, a broadcasting corporation, and a steel trace.

Working hours

Most of our informants work full time as measured by their actual working time; only eight women work less than 35 hours a week (see Table 6). 59 of our informants (55%) work between 35 and 45 hours a week; 75% of those in developing. Mainly women in leading positions work very long hours. Of the 25 women who work between 45 and 60 hours a week, seven are in leading positions and all four with regular working hours of 60 hours and more. There is no correlation between working hours and the type of company the women work in. Informants working in ICT companies as well as those in user companies (non ICT companies) show the same tendency towards long working hours.

	support	web design	developing	marketing	project management	leading position	teaching	total
	1	1		2	2	2		8
under 35	8%	8%		**20%**	8%	11%		7%
	8	7	18	5	17	2	2	59
35 to under 45	67%	54%	**75%**	50%	65%	11%	(67%)*	55%
	3	4	3	3	5	7		25
45 to under 60	25%	31%	13%	30%	19%	**37%**		23%
						4		4
60 and more						**21%**		4%
missing		1	3		2	4	1	11
total in task category (100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

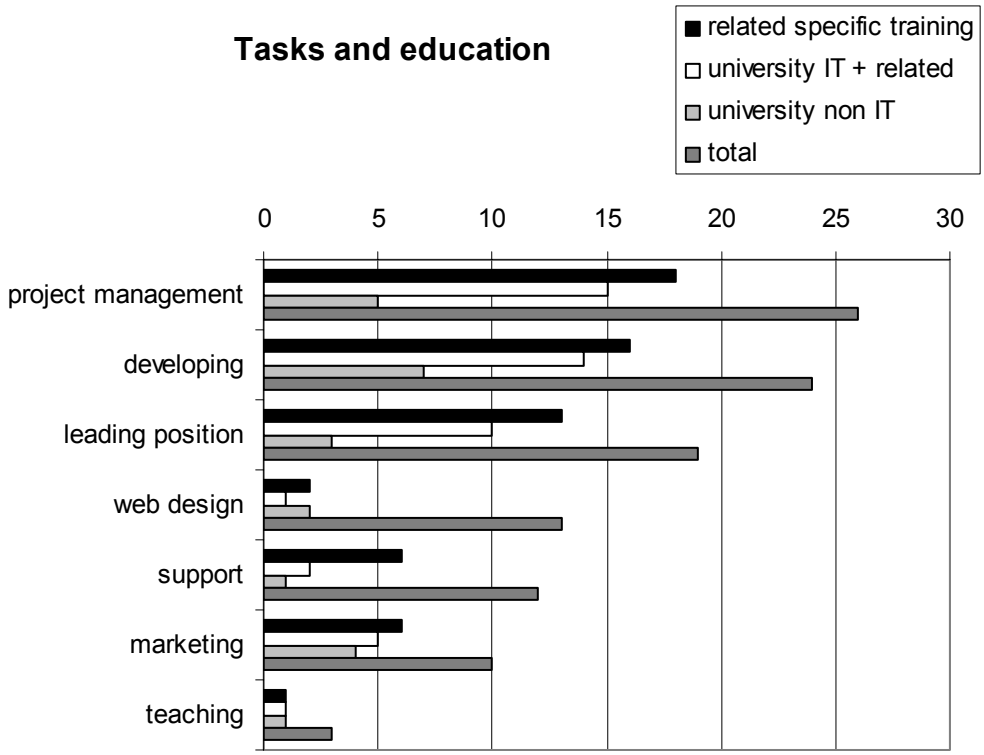
Table 6: Tasks and working hours – frequencies and percentages, n = 107 women

Education and qualification

Of 107 informants 62 have a formal initial education in an area related to ICT (see Table 7); 47 of them a university degree in ICT (and 20 of those have a degree in informatics) or in related subjects like physics or mathematics. Overall there are 48 women in our sample who have a university degree in ICT or related subjects. One of the Belgian informants did her initial training in chemistry where she got a degree and went to the US for her dissertation. Back in Belgium she did a complementary degree in computer science to work as a developer and later on another complementary degree in educational technology for adult education. 23 of our informants have university degrees in non ICT subjects, 9 of them are Irish.

Table 7 shows the relationship between education and job category. Percentages are given for the women in each task category to make them comparable, although absolute frequencies are quite low. Nevertheless we can see that especially informants working in project management

have related specific training (69% of the women in project management). Figures are also high for women in leading positions (68%) and in developing (67%). Women working in web design often do not have related training in ICT (only 15%). 58% of the women project managers and developers have a university degree in IT or a related subject. This also applies to 53% of the women in leading positions and for half of the women in marketing (5 cases). Another four of the women in marketing have university degrees in other subjects, but also seven of the women in developing hold non IT university degrees.



	related specific training	university IT + related	university non IT	total per task
	18	15	5	26
project management + head of internal department	**69%**	**58%**	19%	100%
	16	14	7	24
developing / programming	67%	**58%**	29%	100%
	13	10	3	19
leading position / university + single-person company in IT	68%	53%	16%	100%
	2	1	2	13
web design + graphic designer / Internet journalist	15%	8%	15%	100%
	6	2	1	12
support / administration / helpdesk	50%	17%	8%	100%
	6	5	4	10
marketing / public and business relations	60%	50%	**40%**	100%
	1	1	1	3
teaching	(33%)*	(33%)*	(33%)*	100%
total	62	48	23	107
total	58%	45%	21%	100%

* the percentages are not considered as the overall number of persons in teaching is too small

Table 7: Tasks and education – frequencies and percentages, n = 107 women

Varied profiles: a description

This section describes the data derived from the narrative interviews in more detail, following the structure given by the explanatory variable. Due to the fact that not all topics have been covered in each interview, there is a rather high number of missings [2].

Background

Our informants mainly come from the city (see Table 8): twelve (of 15) Italian informants, seven (of 8) Irish, and six (of 7) Portuguese. While 9 (of 12) UK informants come from small families, eight (of 12) Italian women grew up in a large family. While 40 (37%) women mention having grown up with boys – twelve of them from Italy, for 27 (25%) – most of them from Belgium, France and the UK (6 cases in each of these countries) – this was not the case.

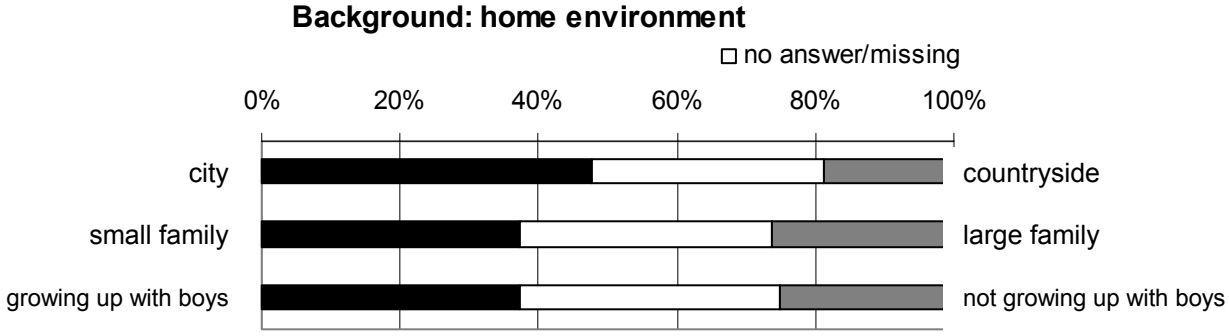


Table 8: Home environment – percentages, n = 107 women

An open question helped identify other relevant factors in the women's home environment. Five women stress the importance of playing with boys and playing computer games; three mention to have been in all girls schools. A few women have an ethnic background and/or come from another country, such as one of the Belgian informants who comes from Spain (via Luxembourg), a UK informant who was born in Sri Lanka, and an Italian woman who was born in Tripoli. She describes herself as coming from a cosmopolitan family. Women point to such varied experiences as "the big freedom" one enjoyed in her family, coming from a "very traditional Italian family where boys and girls are not raised with the same purpose" (one woman who lives in Belgium), or another one about her parents who gave such high value to work. Apart from the family atmosphere special constellations are mentioned as important: divorced parents (2 cases), being the only child (1 case), and having lived for a while with her grandmother after graduating in chemistry. In this case it was the grandmother who encouraged her to re-orient her career – "she saw an add about a post grad in computers and told her granddaughter that this could be a new world with fewer barriers".

Only 20 of our informants have a *technical family background* with their parents working in a technical profession. While in 14 cases it is the father who works in a technical profession (as an engineer, physicist or computer specialist), in three cases the mother has a related profession or education (one computer engineer, one agronomy engineer and one mother with

[2] The numbers of missings are therefore given for each variable. Tables with figures for all variables (frequencies and percentages) are provided in Annex 2D. The answers to open questions of the coding scheme are summarised in those cases where they seemed interesting. Differences between countries and categories of tasks are only mentioned when they are significant.

a degree in mathematics). In three cases both parents work in technical or scientific professions and one Italian woman has a very strong science background in her family, with her father in astrophysics, her mother in bio chemistry, and other close relatives in physics, geology, and chemistry.

There are quite a number of *significant others* who in one or another way influenced the women's career choice (in 81 cases). (Only 16 women do not mention any significant other person of influence). These significant others are family members (62 cases), teachers (15 cases), friends (9 cases), and colleagues (4 cases). Very few (9) of these women felt discouraged, such as the case of a woman whose adoption family did not believe in her, of a widowed mother living in the countryside who feared her young daughter would not succeed with a non-traditional career choice or a father who thought that there were no jobs in the ICT sector. Only two women talk about bad experiences in school – being discouraged from planning a career for herself (one case) or from taking honours mathematics at an all girls convent school.

Most of the experiences the women reflect upon are positive. Especially parents were important in encouraging and supporting their daughters. Eight of the women mention both parents as encouraging them to learn and study. In 18 cases the women stress the importance of the father. Fathers were experienced as role models (11 cases), as generally supportive (11 cases), and in only six cases they provided their daughter with computers/expertise. One of the fathers is described as explaining how things work, the daughter being a companion in all kinds of hands-on work and tinkering. One woman mentions that she like her father likes electronic engineering, "so this must be hereditary". In sum, fathers are the ones who explain to their daughters how computers work, they act as role models, and in some cases they gave advice in the search for a job. Often been given the freedom of choosing their own career is mentioned as decisive.

Mothers also play a major role in supporting their daughters (15 cases). Mothers are mainly mentioned as role models (8 cases) and as generally supportive and encouraging (8 cases). In three cases it was the mother who introduced the daughter to computers. One woman from Italy describes her mother as very dynamic and extroverted. Another Italian woman was influenced by the entrepreneurial attitude of her parents and especially by her mother's spirit of autonomy. Parents' support is mentioned in particular in the case of our Italian informants (13 cases).

Siblings were influential in the case of ten women (3 of them from Italy). In five cases it was the brother who provided computers/expertise. Both, brother and sister of an Austrian informant work in technical fields, but it was especially the older brother whom the young woman admired and who actively supported her. One Irish and one French woman talk about encouragement from their sister, while in two French cases the women did not follow their mother's and sister's role model, all of them teachers. In some cases (8) women got support from other family members, such as husbands (3 cases), grandmothers, the family-in-law and an aunt. Nine women mention friends as important. 14 women talk about their teachers as having been encouraging but in only five cases teachers were the ones who provided computers/expertise and in one case the mathematics teacher was experienced as role model. Four women mention support from their first employer, a mentor in the company or the manager of the company, and one woman got encouraged by a woman she worked with as librarian.

Many women had support from others, but most of our informants see their *career choice* as having been taken independently (85 cases, 79 %, see Table 9). In 19 cases (18%) women had

to assert themselves against contrary expectations. More than half of our informants (55 cases, 51%) look at their career in ICT as having grown out of opportunities – a career choice "by chance" in contrast to focused (which applies only to 21 cases).

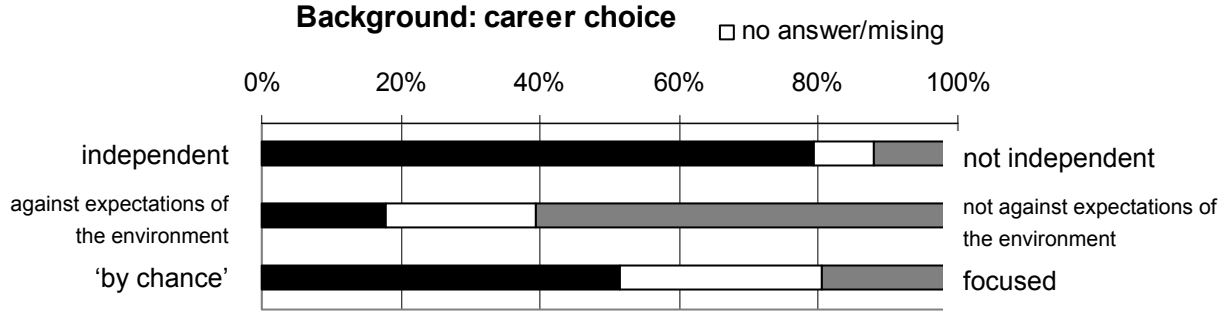


Table 9: Career choice – percentages, n = 107 women

By far the most dominant *motivation* for the women to move into ICT is their interest in the field (62 cases). But it is not always clear if this was the original motivation for their career choice. It rather seems that for some women the interest in the field emerged after they had started to work in ICT. For only nine women (3 of them Irish) the salary was the decisive factor. 25 of the women looked at a job in ICT as offering opportunities in one or the other way, mostly to find a (good) job. For some informants moving into ICT offered the chance to find a new (more interesting) job, to move away from their region of origin or to return to the labour market after having children. Some women chose ICT by elimination, such as those two women who did not want to follow the role model of an older sister or the case of a woman who was interested in mathematics, had a limited choice at university, and wanted to "do something different from what women normally do".

Factors shaping the women's careers

In this section we describe the diversity of women's career paths. We identify ruptures and breaks, look at support at work and promotion, at perceived constraints, and at the women's plans for their (professional) future.

Ruptures or breaks in their career have been experienced by 30 of our informants. In 19 cases the fact of taking maternal leave caused a career break. This is less frequent than may be expected – one (of 8) cases in Portugal, two (of 8) cases in Belgium, five (of 7) cases in France. Among those who did experience maternal leave as a career break, eight work in leading positions and four in project management.

Twelve of our informants – four of them in project management, three in a leading position – think that they made a wrong career move at some point. One got the wrong education and entered the ICT sector without a degree; another one with an MA in physics decided to abandon a career in academia and started to work as analyst programmer. While these are examples of women who moved into ICT from another profession and/or education, there are also examples of having taken a wrong career step, such as an Austrian woman who worked as a high-level project manager in a steel company and applied for the position as head of sales in a subsidiary. Economic difficulties of this firm forced her to go back to her old position and from there into the internal training department.

As regards *renouncements and regrets* (open question in the coding scheme) mainly bad decisions in education, such as not getting a degree or not going to university, are mentioned (6 cases). In five cases the women feel they are in the wrong job or followed a wrong educational path and one woman regrets that she did not go abroad during her studies because of her boyfriend. Among the things these women would have preferred are working as an architect (2 cases), doing something more artistic and creative, being an actress, and working in a web profession. Three women missed out important professional opportunities, such as not having moved to Rome to an interesting position because of her family, or having left their job in a good company (one Italian and one Irish case). Two women regret not having enough time for their children. In two cases women had many different jobs or a succession of short contracts. One of these women finally ended up in a company where it was possible to work part-time.

As regards *promotion and support at work*, women's experiences are not so good. 17 women (16%) express that they are in a dead end position. One of these women has taken early retirement, another one works as a teacher now. Seven of the women in a dead end position work in project management. One woman working in developing has no possibility to get a part-time job. There are three cases of women working in small companies or small departments who do not see the opportunity for a career move. While 30 women (28%), eight of them now in leading positions, mention having (had) support from a mentor, 38 women (36%) had "to do everything themselves".

Asked for their *plans for the future,* 36 women (34%) would like to move into project coordination; another 34 (32%) want to have more to do with clients, 27 women (25 %) want to do more conceptual work, 17 women (16%) more design activities, and 11 women (10%) want to move into project acquisition. Career plans are not evenly distributed over job categories. (see Table 10 – the highlighted figures are the highest percentages for each future plan). Women in project management are the most explicit concerning future career steps with half of them planning to move into project coordination, another half (46%) wanting to have more to do with clients, about a third to do more conceptual work, and 19% to move into project acquisition. 38% of women in web design want to do more conceptual work, and 31% more design activities.

We also looked for career steps the women envision. Only 36 women (34%) want to gain a leading position, while for 49 women (46%) this is not their career goal. 29 women (27%) – 11 in project management, 6 in developing – plan to change employer/company. Numbers are especially high in Belgium (11 women). Finally there are 8 women (7%) who would like to go abroad.

	support	web design	developing	marketing	project management	leading position	teaching	total
in terms of work								
	1	2	10	2	13	8		36
move into project coordination	8%	15%	42%	20%	**50%**	42%		34%
	1	3	6	4	12	7	1	34
have more to do with clients	8%	23%	25%	40%	**46%**	37%	(33%)*	32%
	1	5	5	1	9	4	2	27
more conceptual work	8%	**38%**	21%	10%	35%	21%	(67%)*	25%
		4	4	2	4	2	1	17
more design activities		**31%**	17%	20%	15%	11%	(33%)*	16%
		2	2	1	5	1		11
move into project acquisition		15%	8%	10%	**19%**	5%		10%
in terms of career steps								
		5	7	3	13	8		36
gain a leading position		38%	29%	30%	**50%**	42%		34%
	3	3	6	2	11	3	1	29
change employer/company	25%	23%	25%	20%	**42%**	16%	(33%)*	27%
		1	3	1	3	2	2	12
get self-employed		8%	13%	10%	12%	11%	(67%)*	11%
	1		2		3	2		8
go abroad	8%		8%		12%	11%		7%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 10: Steps ahead / plans for the future by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies)

Other plans for the future are: to get a permanent position, to always do and learn something new, to find a part time job, to work fewer hours, and to work from home.

Looking at the *requirements* for advancing in their field, 39% of our informants (42 cases) say that they would need additional training, while for 42% (45 women) this does not seem to apply (see Table 11). Especially informants in Portugal (12 cases) and France (11 cases) mention the need for additional training. As regards job category, it is mainly women in project management who mention additional training (14 cases) but not those in developing (with 13 women not mentioning the need for more skills and training). 30 women (28%) – 12 of them Portuguese and, again, many (10) from project management – think that a career in their field would require working longer hours.

	support	web design	developing	marketing	project management	leading position	teaching	total
requirements								
	2	5	9	4	14	6	2	42
additional training	17%	38%	38%	40%	**54%**	32%	(67%)*	39%
	2	4	7	3	10	4		30
longer hours of work	17%	31%	29%	30%	38%	21%		28%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 11: Requirements by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies)

26 of our informants, many of them (11) in project management, do not see higher positions as attractive (see Table 12). Arguments are that a manager does not have any private life or that a higher position means too much pressure and involves dealing with political matters – aspects that are seen negatively by some.

	support	web design	developing	marketing	project management	leading position	teaching	total
constraints								
	2	1	5	2	11	4	1	26
higher positions not seen as attractive	17%	8%	21%	20%	**42%**	21%	(33%)*	24%
	2	4	1		6	5	2	20
lack of career possibilities	17%	**31%**	4%		23%	26%	(67%)*	19%
		2	4	2	7	5		20
lack of support		15%	17%	20%	**27%**	26%		19%
		1	1		1	2		5
age		8%	4%		4%	11%		5%
	2		2					4
lack of degree	17%		8%					4%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 12: Constraints by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies)

A major *constraint* is the lack of career possibilities (20 cases). This observation applies especially to those working in web design and in project management, but also to some women in leading positions. Another 20 informants do not feel sufficiently supported in their work. Five women, two of them in leading positions, experience their age as a constraint. One is a 55 years old independent IT consultant, the other one, aged 47, general manager in a software company, both from the UK. Furthermore, a programmer working in the IT department of a bank in Austria (age 45), an ICT project manager in Portugal (age 38), and a

webmaster in France (age 37 years). Only four women, three of them in the Austrian sample, mention not having a degree as a major career obstacle. Two of them work in support, and two in developing. There are two cases of women who do not feel sufficiently qualified. One had difficulties with computing from the beginning of her professional life; another one, although quite successful in her job, feels insecure in her position as a project manager due to her lack of in-depth technical knowledge. Two Portuguese women mention the crisis of the national economy. Three women point to the structure of their company with few levels of hierarchy as constraints.

Support from partners

79 (74%) of the 107 women interviewed have a partner. 38 of these partners (in 9 Irish and 7 Portuguese cases) have a profession close to their field of work (see Table 13). While most partners (56 men) seem to be supportive of the women's careers, in five cases (2 in Portugal, 2 in Italy) the male partner is critical of the woman's professional commitment. Of these five four work in the same field as their spouse – the situation of both partners working in ICT jobs can be quite stressful. One of the women remarks that her partner would prefer her to have a more "quiet" job; another one says that their both working in the ICT area makes organizing childcare rather complicated. However, the majority of men who work in the same profession are supportive of their partners' careers (in 31 of 38 cases).

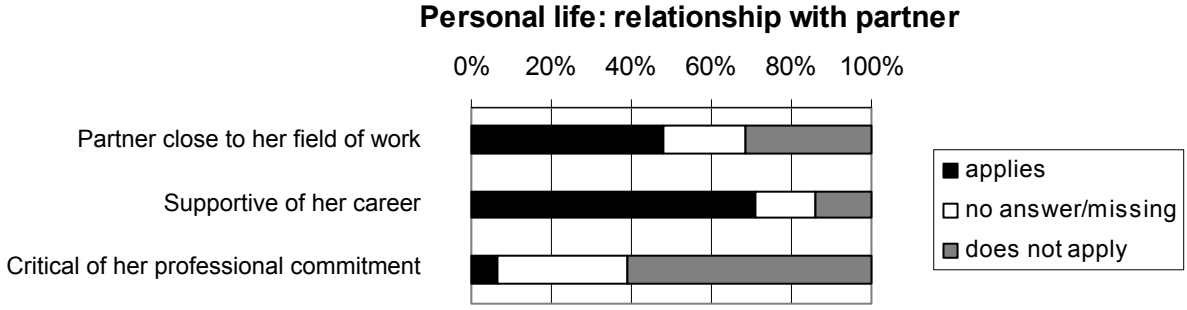


Table 13: Relationship with partner – percentages, n = 79 women

Working conditions

We asked for *salaries and work contracts* (see Table 14). Most women (83 cases) are content with their contract conditions and the majority (68 cases) think that their salary is adequate. However there are 20 women who do not think so, ten women explicitly mention unfavourable contract conditions, five of these are dissatisfied with both. The cases of inadequate salaries come from Italy (6 cases), the UK (4 cases), and Belgium (4 cases). Five of the women with bad salaries work in support jobs, but there are also cases in project management (5) and in web design (4). Three out of the ten women with unfavourable contract conditions are French.

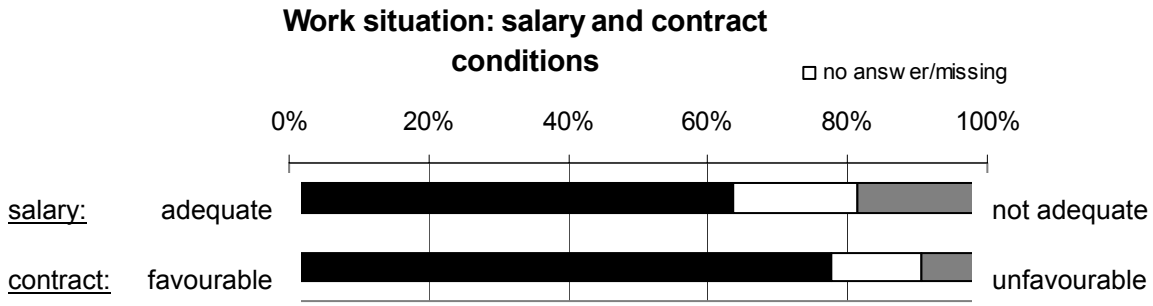


Table 14: Salary and contract conditions – percentages, n = 107 women

As concerns the *quality of working conditions*, 68 of the women (64%, see Table 15), most of them in leading positions and in project management, describe themselves as enjoying a high level of discretion/freedom in their work. Work in support jobs and in developing seems to be more pre-defined and constraining. 57 women (53%) face high work loads, fewer (38 cases, about half of them in leading positions and project management) report on high levels of stress.

Mothers of young children (up to 14 years) more often complain about high levels of stress – 15 (56%) of 27 women as compared to 23 (37%) of 63 women without caring responsibilities. Even more of them mention high work loads – 22 (79%) of 28 women with young children as compared to 35 (56%) of 63 women without young children.

Half of our informants (49%) have flexible working time, for 35% this does not apply. There are variations across job categories, with more flexibility in leading position (63%) and in web design (62%), considerably less in support jobs. We saw a variety of arrangements for flexible working time: Some women (11 cases) are entirely free in organising their working time, be it that they are their own bosses or that nobody controls them. Others have a flexible daytime, giving them discretion over arrival and leaving times (8 cases). Another possibility is to take hours off to compensate for overtime (5 cases) or to be allowed to work from home, which sometimes is reduced to checking e-mails in the evening or to take work home for the weekend (5 cases). Four of our informants mention that flexible schedules are dictated by their employer or that their timetable is controlled by clients' needs. In 33 cases "total availability" seems to be required. This applies mainly to those working in project management (11 women) and developing (10 women).

	support	web design	developing	marketing	project management	leading position	teaching	total
high level of discretion/freedom	6	10	9	4	21	16	2	68
	50%	77%	38%	40%	81%	**84%**	(67%)*	64%
no high level of discretion/freedom	6	2	11	2	3	2	1	27
	50%	15%	46%	20%	12%	11%	(33%)*	25%
high work loads	7	7	10	5	16	11	1	57
	58%	54%	42%	50%	**62%**	58%	(33%)*	53%
flexible working time	4	8	11	5	11	12	1	52
	33%	62%	46%	50%	42%	**63%**	(33%)*	49%
no flexible working time	7	4	11	3	7	3	2	37
	58%	31%	46%	30%	27%	16%	(67%)*	35%
high levels of stress	2	4	7	5	10	10		38
	17%	31%	29%	50%	38%	**53%**		36%
total availability required	3	2	10	4	11	3		33
	25%	15%	**42%**	40%	**42%**	16%		31%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 15: Quality of working conditions by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies in positive answers)

Women's accounts of their *tasks and responsibilities* suggest that for the majority (96 cases) their job offers the opportunity to deploy their skills/competencies (see Table 16). Only in eight cases this does not apply, suggesting that the women may feel underemployed or not sufficiently challenged in their current job. Three of them have leading positions – one a general manager of a software company (UK), one a senior lecturer for computer studies at a university (UK), one an integrated technology services director (Portugal). Among the other five there are a former systems batch analyst, who took early retirement (UK), as well as two developers – one from Italy and one from Ireland who now works as a teacher.

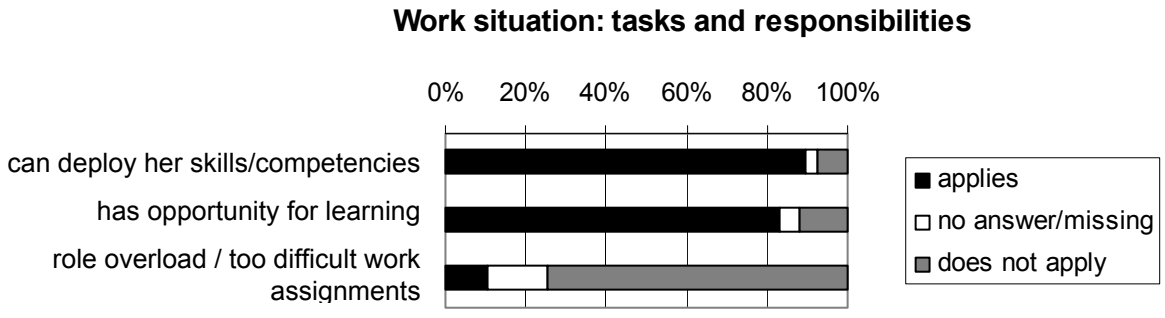


Table 16: Tasks and responsibilities – percentages, n = 107 women

While most our informants (89 cases) have the opportunity for learning in their jobs, 13 women (4 in project management, 3 in developing, 3 in a leading position, one in support, in web design and in teaching) say that this is not the case. Although in many cases women have the possibility to learn, they have to organise this for themselves. In two countries – Portugal and Belgium – economic difficulties are mentioned as reason for less training opportunities.

Role overload and too difficult work assignments are mentioned by eleven women, six of them Portuguese and five of these six in project management. An Irish woman who was promoted to a team manager position, but did not enjoy her managerial responsibilities remarked occasional role overload. Two of the women mentioning difficult work assignments are in leading positions, two in developing, one in web design, and one in support (in Belgium). She thinks that her boss sometimes sends her to too difficult missions in too technically sophisticated firms.

Team work is widespread in the ICT sector (see Table 17). While 64 of our informants work in environments where team work prevails, 26 women mainly work alone and ten engage in both forms of work. While in support jobs solitary work dominates, developing is in large parts team work.

	support	web design	developing	marketing	project management	leading position	teaching	total
	6	6	4	1	4	3	2	26
solitary work prevails	**50%**	46%	17%	10%	15%	16%	(67%)*	24%
	6	6	18	6	16	11	1	64
working in teams prevails	50%	46%	**75%**	60%	62%	58%	(33%)*	60%
		1	2	2	3	2		10
both		8%	8%	20%	12%	11%		9%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 17: Solitary or team work prevailing by task category – frequencies and percentages, n = 107 women

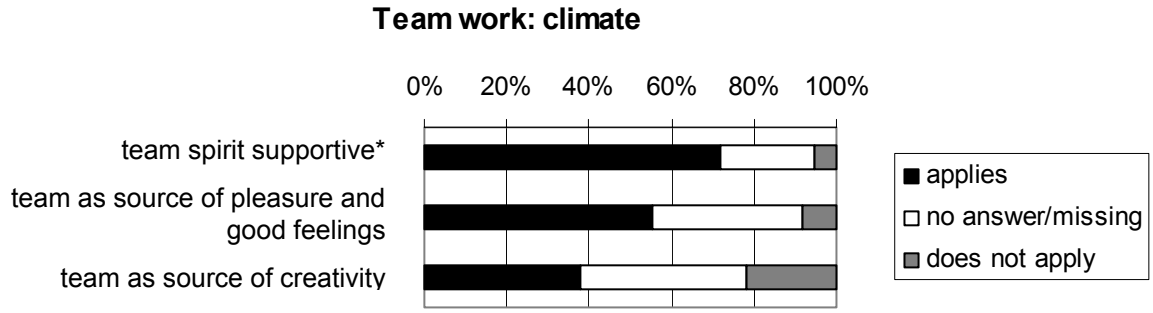
Of the 74 women who mainly work in teams, 35 work in open, project-dependent teams, 22 in stable teams, and in 11 cases both applies (see Table 18). While for women in marketing and in developing it is common to work in open teams, those in leading positions (and in support if they work in teams) tend to work in stable teams.

	support	web design	developing	marketing	project management	leading position	teaching	total
open, project-dependent	1	2	11	7	10	3	1	35
teams	17%	29%	55%	**88%**	53%	23%	(100%)*	47%
	5	2	6		3	6		22
stable teams	**83%**	29%	30%		16%	46%		30%
		1	3		5	2		11
both		14%	15%		26%	15%		15%
total in task categories(100%)	6	7	20	8	19	13	1	74

* the percentages are not considered as the overall number of persons in teaching is too small

Table 18: Open, project-dependent or stable teams – frequencies and percentages, n = 74 women

Teams are mainly experienced as supportive (53 of 74 cases) and only in a few cases (4) as competitive. Some women (5) experience teams as a mixture of both (see Table 19). For about half of the women (41 of 74 cases) the team is a source of pleasure and good feelings and for another 28 women a source of creativity.



* "missing/no answer" values include those 5 cases where the team spirit was indicated as both: supportive and competitive

Table 19: Team spirit – percentages, n = 74 women

Cultural factors

The coding scheme provides data concerning two cultural factors – aspects of gender and women's relationship to technology. Tables 20 and 21 list the corresponding variables in the order of frequencies of positive answers.

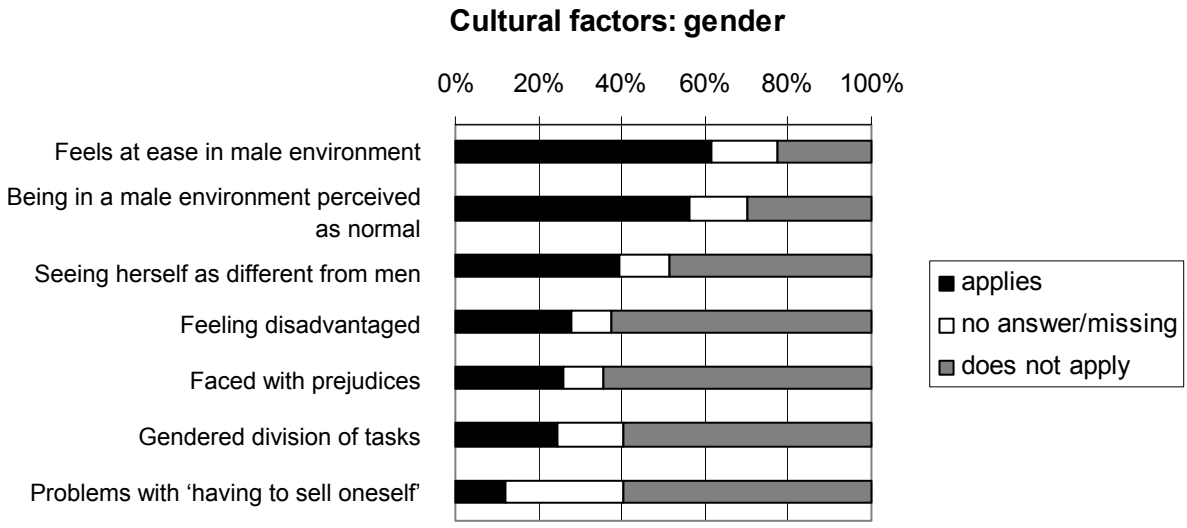


Table 20: Gender – percentages, n = 107 women

Concerning *gender* aspects we see that the majority of the women feels at ease in a male environment (66 cases, 62%, see Table 20). Moreover most of them perceive being in a male environment as normal (60 cases, 56%). Only one woman perceives a male environment as normal but does not feel at ease in it. In particular women in developing (18 cases) and in project management (15 cases) feel at ease in a male environment. Having grown up with boys does not seem to make a difference in this respect. Positive perceptions are most frequent in Belgium (13 cases), Ireland (11 cases), and France (10 cases). Of the 24 women

(22%) who do not feel at ease in the male environment, the majority comes from Austria (6 cases), the UK (6 cases), and Portugal (6 cases).

While 42 of our informants (39%) perceive themselves as being different from men, to 52 women (49%) this does not apply – among them more often young women. Interestingly, women in leading positions, more often than those in other jobs, see themselves as different from men (13 cases). About the same number of women feels either disadvantaged (30 cases) or faced with prejudices (28 cases). The two variables are highly correlated: In 18 cases women feel disadvantaged as well as confronted with prejudices. Being exposed to prejudices is weakly correlated with a gendered division of tasks in the company, which applies in 29 cases. 13 of our informants (12%), seven of them in project management, mention problems with "having to sell themselves".

The women's *relationship to technology* is overwhelmingly positive. The majority of our informants experience technology as source of competence and high achievement (73 cases, 68%, see Table 21). For 59 women (55%) technology is a 'natural' element of everyday life. This applies in particular to informants in Portugal (13 cases), Belgium (11 cases), and Italy (10 cases). 53 women (50%), many of the Portuguese (12) and French (10) cases, experience technology as a source of creativity. These positive connotations are comparably frequent in web design and in marketing (69 and 60% compared to an average of 50%).

In a few (8) cases technology is a source of anxiety and feeling of incompetence (see Table 21). These women work in different jobs on different levels of hierarchy. Three of the project managers (2 Portuguese, one Belgian) and a visual graphics designer from Portugal mention feelings of anxiety and incompetence towards technology. Interestingly, this also applies to two women in leading positions: one, a Portuguese informant, works for a computer service provider that is operating worldwide, and a woman from the UK is director of information and technology services in a trade association. While the Portuguese woman characterises technology as "a source of stress and invasion", a Belgian project manager dislikes technology and is satisfied as long as she manages "to type her text in Word". Two of the Irish developers refer to the high level of technical competence required in their job as creating anxiety. This, however, seems to diminish with experience.

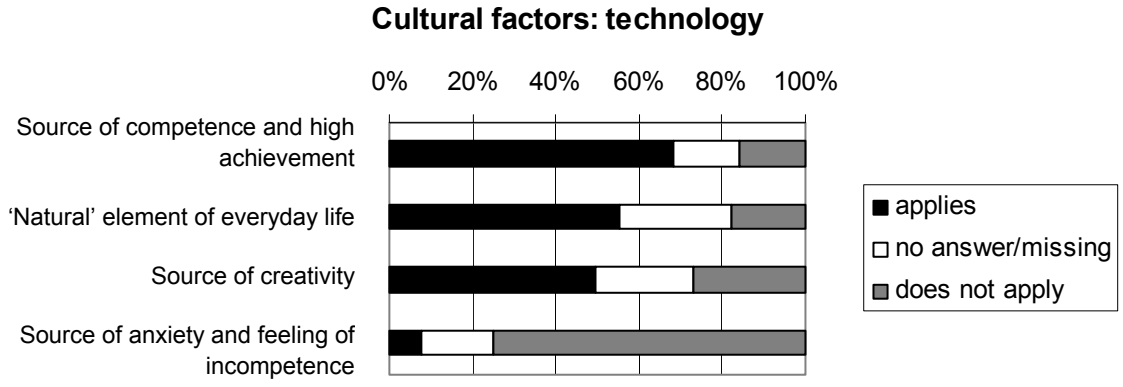


Table 21: Relationship to technology – percentages, n = 107 women

Career patterns – the result of a cluster analysis

This section describes our sample of 107 women not only in terms of single variables but identifies groups of informants that have some characteristics of educational background, job, and work experience in common. A cluster analysis was used to help identify these different career patterns.

In a first step variables were selected for the cluster analysis[3]. Age and tasks were considered. They were re-coded into binary variables with three categories of age (under 30, 31 to 40 and 41 and older) and seven job categories (as described above). Attributes of women's personal life were considered, such as living in a partnership, having caring responsibilities for children, and having a partner who is close to her field of work or supportive of the woman's career. Informants' background was included, taking into account if they have grown up with boys, if they had parents with a technical professional background or encouraging mothers, fathers or teachers. Furthermore their education, characteristics of their career path and their work situation as well as gender aspects and their relationship to technology were considered.

In a first explorative round of cluster analysis the Ward linkage method was used as suggested by Backhaus et al. (2003) with the binary squared Euclidean distance measure to get a good first impression of possible clusters. After this first round a number of eight clusters seemed reasonable. For the second round variables that did not contribute to the clustering were excluded[4]. Others were transformed or replaced[5]. University degrees (in IT and related subjects as well as other university degrees) were included in the analysis, so that in the end 28 variables were considered (see Table 1 in Annex 2E).

In a next step the Jaccard distance measure was used as suggested by Moosbrugger and Frank (1992). It is more appropriate for binary variables, especially for asymmetric ones as used in our case. As the results with this method were not really conclusive we finally ended up using the Rogers and Tanimoto distance measure (described in Kaufman and Rousseeuw 1990). It has the effect that the tasks and age categories get more weight in the analysis. This turned out to be an advantage. Using the Complete Linkage algorithm distinct and conclusive clusters emerged (for detailed data on the clusters see Table 2 in Annex 2E). Again a number of eight clusters was most appropriate. While some of these patterns are close to the life story patterns described below, some highlight other aspects of the women's careers.

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3 All variables used in the cluster analyses were re-coded into binary variables with the value 1 representing the presence of the characteristic and 0 representing absence. Missing values were re-coded as 0. Variables with many 0 values were not considered as they would not contribute to the forming of clusters and could lead to the distortion of the result. For highly correlated variables (e.g. the variables concerning gender) those were chosen that were most expressive.

4 Excluded variables are: "living in a partnership", "technical background of the parents", "encouraging mothers", "supporting fathers", "encouraging teachers", "independent career choice", "maternal leave as career break", "has to do everything herself", "high level of discretion/freedom", "gendered division of tasks"

5 The variable "no flexible working time" was used instead of "flexible working time" and "no adequate salary" instead of "salary adequate". The variable "high work loads" was replaced by "high levels of stress". The task categories were recoded.

Cluster 1 Chance careers

Chance careers (20 women)

- Age: under 30 (13)
- Tasks: web design (6), developing (5)
- technology as source of competence and high achievement (16)
- growing up with boys (11)
- career choice ‚by chance' (11)
- large company (8)
- team as source of pleasure (8)
- no flexible working time (7)
- salary not adequate (5)

Many women in Cluster 1 are quite young (under 30). They come from a diversity of educational backgrounds, mostly non-IT degrees. Many of them encountered ICT and job opportunities in the sector 'by chance'. Some of them, especially women from the UK, started to work in clerical jobs before moving into the ICT sector. While a few have jobs in multimedia and online-journalism, the majority works in web design and developing. The fact that jobs in web design tend to be low paid may be the reason, why some women in this cluster judge their salaries as not adequate.

About half of the women in Cluster 1 have grown up with boys, some of them come from the countryside, and many of them have been attracted into ICT by the opportunity for a job and for professional development.

Cluster 2 Open careers with strong IT background

Open careers with strong IT background (24 women)

- Age: under 30 (20)
- Tasks: developing (7), project management (5), support (4)
- related specific training (21), university degree in IT or related (15)
- technology as source of competence and high achievement (18)
- team as source of pleasure (16)
- career choice ‚by chance' (11)
- supportive partner (11)
- support from mentor (10)
- large company (10)
- no flexible working time (7)

The women in this cluster are also predominantly young and, in contrast to those in Cluster 1, most of them got their (initial) training in ICT. Almost two thirds of them even have a

university degree in IT or in a related subject. Most of them have positive job experiences and some already have quite successful careers. Nearly half of them mention a mentor, who helped them or still supports them. In this cluster we also find some of the young women we describe as 'open and not yet having arrived' in our life story patterns, especially the Austrian informants, but also women from Belgium and Italy.

Cluster 3 Consolidated careers

Consolidated careers (15 women)

- Age: 31 to 40 (14)
- Tasks: project management (9)
- related specific training (15), university degree in IT or related (13)
- technology as source of competence and high achievement (12)
- large company (11)
- growing up with boys (9)
- supportive partner (8)
- higher positions not seen as attractive (7)
- few: caring for children (5)

Women in this cluster have similarities with those in Cluster 2, but they are older (between 31 and 40) and already more advanced in their careers, with more professional experience. All of them have ICT related education and nearly all of them have a university degree. This is a group of highly qualified and successful women with what we call 'consolidated' careers. Nearly two thirds of them work in project management. These are mainly women in leading positions, some of them satisfied with their present position but some of them very ambitious. Only one third names caring responsibilities for young children. Some have very straight careers, e.g. university careers of Austrian women or other straight careers towards management positions of Belgian or British women.

Cluster 4 Women in leading positions

Women in leading positions (13 women)

- Age: 41 and older (10)
- Tasks: project management (5), leading position (6)
- supportive partner (12), partner close to her field of work (10)
- technology as source of competence and high achievement (10)
- large company (9)
- high levels of stress (9)
- related specific training (8), university degree in IT or related (8)
- career choice ‚by chance' (8)
- caring for children (8)
- support from mentor (6)

The women in Cluster 4 are on the average older than the women in the other groups (41 and older). They have reached leading positions, including higher level project management. Nearly all of them have straight careers with an IT background, many hold a university degree. What is remarkable is the high proportion of supporting partners the women refer to, many of them working in a field close to theirs. This evokes men who are understanding and helpful concerning their partner's work situation (and not necessarily share family responsibilities). Among the women in this cluster we also find a number of self employed women, some heading their own company (Austria), but also directors (France, Portugal) and heads of department.

Cluster 5 Reorientation careers

Reorientation careers (8 women)

- Age: 31 to 40 (7)
- Tasks: web design (3), marketing (2), project management (2)
- university degree in non IT subject (7)
- career choice ‚by chance' (6)
- caring for children (5)
- technology as source of competence and high achievement (5)
- no flexible working time (4)

In Cluster 5 we mainly find women who at some point re-oriented their career towards ICT, coming from a diversity of educational backgrounds. Many of them entered the ICT sector because an opportunity opened up. Nearly all of these women have university degrees in non-IT subjects, one worked as a kindergarten teacher before. The women in this cluster also have a great variety of jobs and skills. Some are working as web designers, some in marketing, and two in project management. Many women in this group have caring responsibilities for young children.

Cluster 6 Mobile careers

Mobile careers (12 women)

- Age: 31 to 40 (9)
- Tasks: web design (3), developing (3), project management (2), leading position (2)
- mobility in IT (11)
- supportive partner (11), partner close to her field of work (8)
- career choice ‚by chance' (9)
- gender: feeling disadvantaged (7)
- caring for children (6)
- salary not adequate (6)
- not: technology as source of competence and high achievement (1)

Most of the women in Cluster 6 can be described as mobile in the sense that they have had several jobs in the ICT sector. Especially some French women show a special kind of mobility – they follow their husbands and look for a new job in a new region. These women also mention the support of their partners, some of them especially the career support. Many of the informants in this cluster have an arts background. This led them into jobs in journalism (France), multimedia (France), and technical writing (Ireland). Quite a few of them mention being disadvantaged. In this cluster we find some of the women with 'broken or fragile careers'.

Cluster 7 Low hierarchy jobs

Low hierarchy jobs (5 women)

- Age: 31 to 40 (4)
- Tasks: support (3), developing (2)
- career choice ‚by chance' (5)
- no flexible working time (5)
- gender: feeling disadvantaged (5)
- related specific training (3)
- team as source of pleasure (3)
- not: technology as source of competence and high achievement (1)

In this small cluster we find women who express feeling disadvantaged. Some have low qualifications and all of them work in low hierarchy jobs in support and developing. They do not feel comfortable in their jobs, complain about low pay and they do not have flexible working time. They tend to feel insecure and entered the ICT sector 'by chance'.

Cluster 8 Good careers with some constraints

Good careers with some constraints (10 women)

- Age: 31 to 40 (8)
- Tasks: developing (4), support (2), leading position (2)
- technology as source of competence and high achievement (10)
- related specific training (9), university degree in IT or related (7)
- large company (7)
- no flexible working time (7)
- gender: feeling disadvantaged (5)

Most of the women belonging to Cluster 8 have an IT background (9 of 10), some of them also a university degree, and they are technology-oriented. Many of these women are 'struggling' against adverse conditions, such as lack of job opportunities in the field (Italy), low salaries (Italy), mobbing (UK). One of these women feels unhappy in her job and

therefore wants to leave it for having a family (Ireland). However, some of the women in this group have good jobs and good careers and most of them high IT related qualifications.

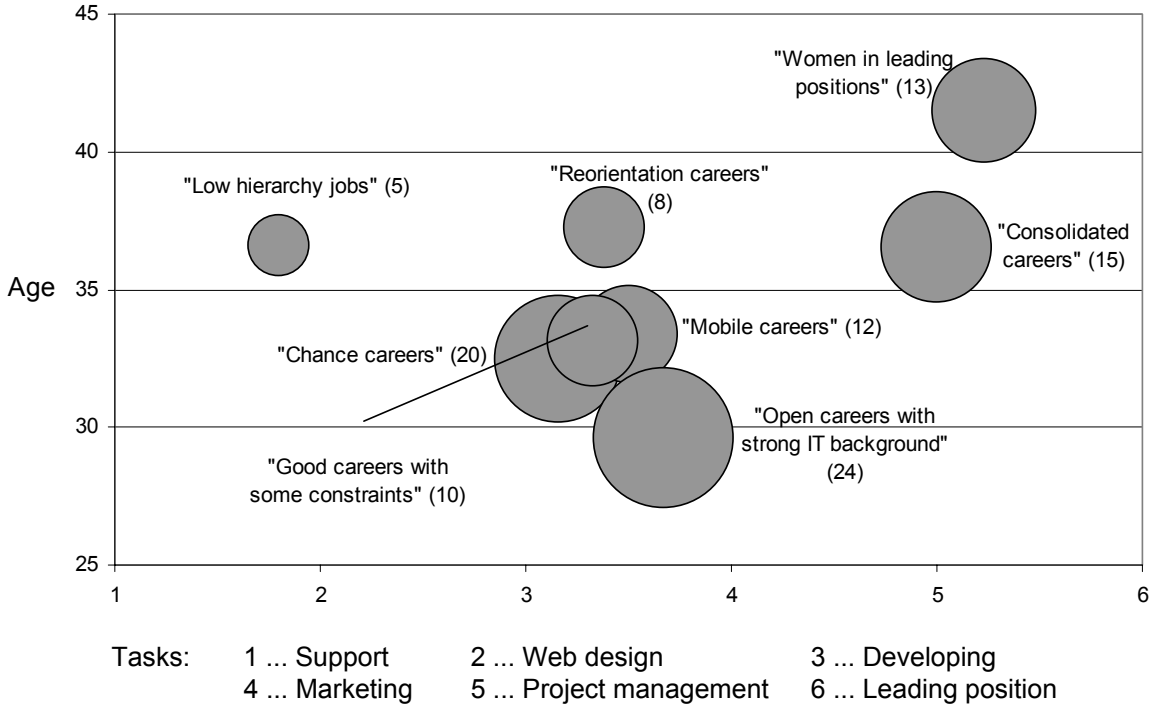


Table 22: Average age and "average" tasks in the clusters (the size of the bubble corresponds to the number of informants in the cluster), n = 107 women

Table 22 shows all the eight clusters, the distribution of frequencies based on the average age and tasks. The size of the bubbles corresponds to the number of persons included.

Most of our female informants were under 35 years old, a majority working in developing and marketing jobs. Many 'Low hierarchy jobs' can be found in web design, women working in this area are between 35 and 40 years old. Also about this age are women belonging to the cluster of the 'reorientation careers'. Women who have leading positions are about 40 years old on the average, some of them work as project managers, others in higher level leading positions. The second group of quite successful careers, the 'consolidated careers', are a little bit younger than those mentioned before and most of them can be found in project management.

As argued at the beginning of this chapter, the most appropriate method for asymmetric variables would have been the Jaccard distance measure. However, the results obtained with this measure were less conclusive than the ones obtained with the Rogers and Tanimoto distance measure. One reason may be that when using the Jaccard distance measure variables such as "large company", "related specific training", "university degree in IT", "university degree in non IT subject" and "supportive partner", "partner close to her work" get very high weight. As a consequence, the resulting clusters do not describe career patterns.

Nevertheless, we give a short description of five of the eight clusters obtained with the Jaccard distance measure (for more details see Table 3 in Annex 2E).

Cluster 1 (16 women) combines "chance careers" of women, most of them with a non IT background, with "re-orientation careers". The women in this cluster are of different age and have different jobs and tasks. Some of the cases we described as "open careers" can be found in this cluster.

Cluster 2 (29 women) integrates women from the "consolidated careers" (12 women), the "women in leading positions" (9 women) and the "good careers" (6 women) clusters. The majority of the women in this cluster can be described as successful in their jobs.

Cluster 3 (11 women) is mixed with no clear profile. Some of the women in this cluster have an art background and are mobile, many work in web design.

Cluster 4 (15 women) is the group of women who feels disadvantaged, many of them working in low hierarchy and low salary jobs, with low qualifications. We also find some "open careers" in this cluster as well as two women with "low ambitions".

Cluster 5 (16 women) contains a great number of young women, most of them with IT background, but also some having entered ICT by chance and without related specific training. In this group of mainly young women some cases of "open careers" can be found.

Life story patterns

The categories we use in our analysis of life story patterns are not theory-based but empirical, grounded in the material itself. They reflect some of the colour the women themselves gave to their narratives. One of the reasons to look for life story patterns is the diversity of our informants' professional trajectories. There are so many variations and the trajectories themselves are not 'telling' unless seen in the context of the women's life stories – opportunities, choices, life themes. One of the sources of this diversity is that our informants come from different cultures; another that each national team made their own choice, based on what they knew about typical and interesting careers of women in their countries. Although this is a disadvantage from a methodological point of view, this also is a source of richness.

The patterns we describe are based on a comparative analysis of all 107 female biographies, taking into account national/cultural differences. They offer a particular view onto the professional trajectories and biographies across these differences (which are described in detail in the national synthesis reports), trying to reach some common conclusions. They provide a specific reading of the very rich and varied material. The organizing principles behind the patterns differ:

- Two of the patterns – *Straight careers in ICT* and *Combining art with technology* – describe specific types of trajectory.
- The focus of the patterns *From the margins to a field of opportunities*, *Buildings one's own environment*, *Being open, having not yet arrived* and *Good work but limited ambitions* is on different strategies.
- Two patterns – *Struggling but not giving up* and *Fragile or broken careers* – reflect the experience of constraints and how the women respond to them.

<table>
<tr><th colspan="2">SPECIFIC TRAJECTORIES</th></tr>
<tr><td>Straight careers in ICT
Taking a passionate interest in science, math and/or technology
In some cases looking for a field with good job prospects
Following one of the pre-defined trajectories in ICT
Having a strong notion of excellence and in some cases also striving to the top
Accepting the conditions for success in ICT, including long hours, stressful working conditions, a competitive environment and (in some cases) hierarchical structures</td><td>Combining art with technology
Having a background in art, graphic design or journalism
Getting in touch with ICT and turning it into an integral part of their work
Developing a passion for both fields
With no boundaries between work, family and social life, and personal inclinations</td></tr>
</table>

<table>
<tr><td colspan="2">DIFFERENT STRATEGIES</td></tr>
<tr><td>From the margins to a field of opportunities
Having seized the chance to move out from their milieu – a rural background (Austria), an area with limited job opportunities (the South of Italy) or ethnic background (UK) – into jobs that offer good pay, a high level of job security, and the opportunity for learning
In some cases rebelling against their home environment but in most of the cases staying emotionally attached
With different entries into ICT – getting interested in IT at school, taking an engineering or computer science degree, or encountering IT in their first jobs
Being interested in working with technology but not passionate</td><td>Building one’s own environment
Being goal-oriented – the women set steps to realize their career goals and life themes
Actively creating the environment that corresponds to their ideas and attitudes
Defining themselves through the content of their work
Some of them coming from supportive families and having chosen supportive partners
Some of them having a strong engagement for women in ICT</td></tr>
<tr><td>Good work but limited ambitions
Having good qualifications and good work, feeling competent in their work
But other important life perspectives (having more time for their family, hobbies) and few professional ambitions</td><td>Being open, having not yet arrived
Having had a good start in working life, liking their job in ICT, and working hard
Taking up opportunities where they offer themselves, not always sure where to go
Or looking for alternatives, already concretizing them
In some cases too young to be able to know where to go in the future</td></tr>
<tr><td colspan="2">RESPONSES TO CONSTRAINTS</td></tr>
<tr><td>Struggling but not giving up
Having received a good education and often accumulated an interesting skill profile
Suffering from adverse working conditions, problems in managing work and family life or limited perspectives in their region
Looking for alternatives and starting a training programme in another area
Or after a bad start into working life having succeeded in overcoming obstacles such as lack of qualifications and/or a degree</td><td>Fragile or broken careers
Not having had a good start into working life due to lack of qualifications and/or degree, unsatisfactory working conditions, limited job possibilities, having made a wrong career step, not liking to work in ICT, etc.
Lacking motivating and realistic alternatives
In some cases feeling discouraged and having failed and/or with unfulfilled ambitions</td></tr>
</table>

We will describe these patterns using three to four exemplary biographies of informants from the seven countries.

Straight careers in ICT

Some of the careers are moved by strong interest in math and the sciences. They follow a clear career model and strive to the top. AF09, aged 35, for example stepped right into a typical academic career after finishing her studies. She grew up as an only child. Her mother had worked as a secretary but gave up her job when she was born. Her father worked in the planning of petrol stations. Her parents always were very supportive and she still has a very good relationship with them – "they always had the right degree of leaving freedom but giving support". She preferred boys' games like Lego and playing football. When she was playing with her Barbie doll, she constructed things for her using the Lego blocks. She remembers how proud her family was when she received good grades, what she always did. Her ambition is unbroken – "I am still very ambitious. Only to be average is not enough for me."

Already in her master thesis AF09 found her main research topic – performance analysis of parallel and distributed systems – which she pursued in her dissertation, and later for her postdoctoral degree. After a short interlude as a professor in the Netherlands she got an offer for a full professorship at an Austrian university. So what she likes about her work is "solving riddles and generally the curiosity to get to the bottom of things". For AF09 work is almost like a drug and even things like arranging for a visit to the theatre are difficult to fit into her day. She has a broad field of interests, having learned to play the guitar and to do massages. In her spare time she used to knit. Now she only manages to do little socks for babies when one of her friends has a new child. She manages the web site for a sporting community.

One of AF09's life themes is 'standing out'. It becomes visible in how she describes herself as a remarkably tall child or an excellent student. Standing out is also what she does in the scientific community. She never felt out of place but being a woman contributes to this experience of standing out. It amuses her to see the reactions of surprise when male colleagues that haven't met her before realize that she is a woman and moreover a young woman. One of her fantasies when attending an academic ceremony was: "They all strode in, in their fur coats, and this was such a male clan, and as the only woman the vice rector for personnel, and that's when I thought, to be on top there, this could be a goal".

Women like AF09 are extremely hard working. They are single-minded, taking extreme pleasure in mastering the intellectual challenges of their discipline. The conditions for being successful – a hierarchical structure, a competitive environment and long working hours – are accepted. Being a woman is not a topic in these women's biography, moving in a male world and being successful in it is taken almost for granted.

While AF09 exemplifies a highly successful woman in academia, IREF02 made a remarkable career in the Irish software industry, where she works as a programme manager in a medium sized company. She worked as an engineer first and then as a project leader, leading at one time up to 40 people. On the verge of 40, IREF02 has achieved one of the highest managerial levels in her company. Her story is the story of a woman with a strong technical background who entered the Irish software industry before the booming time of the mid-1990s, and therefore when women's presence in the sector was unusual. The narrative of her work story –

from a company to another, from a job position to another – betrays rather conscious personal preferences and choices that activated different resources and strategies.

After her first job, IREF02 moved to a company that marked her consequent career steps. In a dynamic and technically advanced environment, IREF02 discovered her passion for work in ICT. The company was the first one in Ireland to develop C++ and she was one of the developers. The company also shipped another product with an innovative edge. Despite the disorganisation, IREF02 found that life in the company was extremely fascinating. The company was eventually taken over but IREF02 was not worried. She learned to assume men's behaviour and this affected also the way in which her choices were made. In her next job she missed the competitive atmosphere that she got to love. This is why she quit and found work where again she had to gain the respect of her male colleagues. IREF02 left also this company for no other reason than the fact that a cycle of research and application was concluded. In her words, work had become very much a life style. The definition of her identity included late working hours and socialisation over a drink. Then, now in a managerial position, she got pregnant and had to leave at a time in which the new product on which her team had worked was in its final steps. She arranged everything so that she could return to her job after maternity leave and at the same time focused on the birth of her child.

Straight careers in ICT can be found in all the different national cultures that are included in our study. UKF10, for example, went to excellent universities and has degrees in Electronic Engineering and Information Sciences and in Computation. In her first job, she found herself "thrown in at the deep end", which was fun and required a lot of hand-holding, she remembers. For ten years she moved from project to project in the company and then changed to a mobile telephony service provider as a contractor, working on a three-to-three months basis. In the end she was hired as a technical designer which is about designing new services, researching technologies and products, developing realistic cost estimates and time scales. Forty years old, Milanese ITF16 is a very serious and determinate woman, who chose to become an engineer twenty years ago when there were still very few women. She comes from a traditional family, the father being an entrepreneur, the mother staying at home. She attended a scientific high school, as is the tradition in her family, following her older brother, and studied electronic engineering. What attracted her was the combination of science with a more practical orientation. She started her career in one of the biggest software companies in the world as a product manager. When she had her second child, she stayed at home for one year and when she came back, her boss and mentor not only arranged a part-time job for her but persuaded her to move into marketing. She is in a leading position now with interesting and challenging work and neither she nor her husband have "such a shocking working time". Like many of our Italian informants she has organized a well structured network of baby sitters and family helpers for her two children – her parents and parents in law living nearby.

Combining art with technology

In these careers, it is not technology that is in the foreground but a passion for art and/or journalism, with ICT entering later as an important tool and skill. Accidentally, all three women who combine art with technology come from Italy. ITF15 is 40, lives in Milan and works as illustrator. She has been a "wall writer" and now she is a free-lance web designer. She has a rather articulated background and uneven education path. A continuous coming and going between her science-oriented familiar cultural background and her personal inclination to arts characterises her trajectory. Both her parents are scientists and she grew up "eating bread and physics". Her father taught her to use a PC and do programming in Basic. Although

having attended a scientific high school and having started studying physics, she decided to break with the family tradition, attended a two-year course in graphic art and decided to work as an illustrator in a publishing company. In her work she met ICT and quickly taught herself designing covers for records on the PC. She sees this move as a kind of reconciliation with her family background, "closing the circle between art and science". One of her detours was founding a studio fabricating tapestry, mosaics, and windows, together with friends. They soon found out that they were not really entrepreneurial.

ITF15 works as a free-lancer now, doing all kinds of jobs in advertising and publishing. At the same time she teaches computer science at a 'social centre' (unpaid), where she meets a lot of interesting people. She has a child of nine years, is divorced from her husband, and lives with a new boy friend. Typically for these careers that are close to the arts is that there are no boundaries between professional work, social commitment and private life.

ITF10 lives in Catania. She also works as a free-lancer in digital visual communication and graphic design. She proudly talks about one of her recent, enormously successful products, for which she combined several media – material products (oranges) with painting and digital images. She describes her family as being open-minded, her father working for the Italian Telecommunications company and her mother at home. Even though she moved a lot, she is attached to her home region. Building up a professional network required to move to the North, where she met important designers and created her own company at a time, where ICT was still at its beginning in communication and advertisement. Now she has many job offers but continues to work alone. She got married rather late and has a lot of free time in between periods of concentrated, hard work.

ITF14, aged 44, works as the responsible editorial graphic designer in an important magazine addressing women. She reached this successful position due to her deep passion in both, graphic art and computers. Her father is a graphic designer with his own studio and she partly worked with him, partly as a journalist. She found a mentor and teacher in a famous art director at one of the major Italian publishing houses. She had twelve years of interesting work with lots of travels. When she returned from maternal leave, she felt fed up with the work and thinking of ways to escape she found ICT. She very quickly became proficient at the computer. Her mentor wanted her to follow him to Rome which was a rather attractive offer. But this she could not do because of family reasons. ITF14 has organized a network of baby sitters for her children and is currently deeply involved in a new graphic project for a magazine.

Typical of all three careers is the ease with which the women integrated ICT into their work, developing a passion for both fields, but with their artistic interests and ambitions staying in the foreground. Regarding their life style and way of working they are more artists than computer professionals.

From the margins to a field of opportunities

There are life stories in which ICT is strongly connected with moving out from one's milieu and/or region into promising and relatively secure jobs. While in several cases informants come from marginal regions – the countryside in case of Austria, the South (Sicily) in the case of Italy – in a few other cases its is ethnicity which creates a potentially marginal position from which the women escape. For example, UKF14 is of Indian ethnic origin and, as it was expected that she would simply marry and have children, her education was not considered important. However, this gave her a strong motivation to pursue her education

despite her parents. Her teachers in late secondary education were central to helping her break out of the narrow path which was set for her in Indian culture.

AF04 comes from a farming family with six children. After secondary school she went to a two-year agricultural school, and having finished her apprenticeship she worked on her parents' farm until she was 20. This didn't interest her. Very early she knew that she wanted to move to the city and found herself a job in a small trading and production company where she stayed for seven years. Although she had no background in ICT, she managed the transition from manual to ICT supported work in the office. She talks about the ways office work was organized 20 years ago in such a company. It included everything, from short-hand to typing, accounting, and skilled clerical work. Wanting to develop herself, to learn something new, "become more professional", she found her present job as a developer in the IT department of a bank. This is a respectable and stable environment that offers a variety of fringe benefits for its employees – they reach from six weeks of paid vacation and daily lunch in the cafeteria to a place in a nearby kindergarten and a parking lot. The fact of working in the city centre adds to the attractiveness of her present work. AF04 has achieved what was possible for a woman from the countryside with no high school diploma. Currently, the bank makes the transition from host technologies to a server-client technology. This creates a problem for AF04, since she belongs to the 'old group' who was responsible for the host-based system. AF04 is still very attached to her family. She is always there to help – to pay regular visits, to support decision making in the family. Frequently her brothers' children stay in her apartment when they come to Vienna.

ITF20 comes from a family of landowners in Sicily. Her parents always regretted not having a good culture and education, so they encouraged all of their children to study. She had a deep interest in math and computer science. After graduating as a mathematician she started work as a programmer then analyst in the branch of a company specialized in financial software. After maternity leave her new boss, a woman, offered her to join a new project team on electronic payment. This was very interesting work from a technical point of view. After the birth of her second child, she found it difficult to cope with the changes that implied working as a project manager in another division of the company. There was a period of tough competition, constant arguments and much stress after which she decided to start a new professional life as a teacher of computer science at a technical institute. She does not regret her choice. She says she wants a quiet life with her family but, in fact, she let herself being involved in many new projects and in extra school work and she seems enthusiastic about it.

BEF13, aged 33, works as an information administration consultant for a large solution and service provider. She grew up in Spain with three sisters and one brother, the father a teacher, the mother at home. All four sisters have a university degree. She had a child when she was 16 and with the help of her parents she managed to finish school. This was tough, being at school and returning home to care for her baby son. She went first to Luxembourg and later to Belgium for her studies. Although she never had touched a computer, she decided to study informatics because of the job prospects. She soon discovered that she didn't like programming and switched to library administration and for her third degree information administration. Recently she moved to a part time position in order to find time for her passion, fashion design. This allowed her to reduce her working time from ten hours a day and weekends to a little less, even though tight project deadlines make it difficult at times to keep working hours low. BEF13 likes her work but she does not have any career or mobility project. She has given priority to other things in her life, such as a fashion design course.

These women are interested in working with technology but not passionate. ICT opens a field of opportunities to these women. Entries into ICT vary. While some of the women studied informatics or something related, others encountered ICT in their first (clerical) jobs, seizing the opportunity to qualify themselves, either through learning by doing (the older ones) or through additional training. One of the prime movers of these careers is the chance to get a well paying job offering security, possibly in a large company. In some of the Italian examples the women's choice of ICT is clearly opportunistic in the sense of optimizing the opportunities to get a job independent of their personal orientations and interests. In some cases these expectations are disappointed, such as in the case of ITF03, a young engineer from a small town near Catania. She describes herself as taking after her mother – "dynamic, open, interested in a lot of things" – and quite fond of technical work. Her bad experiences with a low paying job in a large mobile phone company with a 'macho' environment made her lose her interest in having a career.

Building one's own environment

Some informants' stories show a strong will and skill to shape their own environment so that it fits their idea of good work and a good life. This is a theme in their accounts which they address explicitly as 'building'. AF07 is one of the few self-employed women in our sample. Everything in her biography points into this direction. She talks about having had a happy childhood with caring parents with whom she still has a very positive relationship. The central person in her life has been her mother who is at home. She describes her mother as a generous and caring person, who protected her whenever she was in trouble, for example at school – "she was the protecting wall". When at the age of 15 AF07 started thinking about moving away and being on her own, her mother always let her know that this was right, saying: "Go your own way, do what you want, get yourself a job". AF07 (age 37) entered informatics somewhat accidentally. Her ambition was to work on a master thesis with a practical outcome – a product. It happened that one of her acquaintance's offered her a job as a part-time project assistant at a university, where she had to develop special software. She put a lot of energy into this project which was part of her supervisor's long term research programme. After more than two years of intense cooperation both decided to set up their own software company together. Having been an excellent student from her early school days on, liking math, and adoring the work of developing software have shaped AF07's relationship to technology. Her competence is solving problems – to structure a problem, find a solution, and organize its implementation: "This is what I love, I need the hurdles, I always needed them, I need challenges and I need the next mountain to climb up", she says. This is reflected in the software the company produces which supports the solution of highly complex problems.

Being in charge of her own life is AF07's main life theme. She remembers that this was already so when she was a young child. She perceives herself as having created the environment for herself, in which she feels comfortable. When AF07 had her child, her partner, a former social worker who recently retrained and now works as an internal SAP consultant for the city council, switched to working a lot at home. She became engaged in the peace movement and the women's movement as a student – "a conscious woman". There she always met other women, somewhat older than her, who gave her support, encouraging her to go her own way. This made her gain her self-confidence which she tried to transfer to other, younger women and girls, mainly as part of her work in a youth centre.

FF03L, age 39, works as a Web Manager in a Regional Department. This is the story of a woman who found ICT rather late, made an enormous effort to acquire skills in web design

and management, and now builds her career. She did not have such a good start into working life. She comes from a family with a dominant father and an older sister that was presented to her as a role model. She went her own way, thinking herself more enterprising and adaptable than the rest of the family. At university she discovered her interest in geography and after graduating she had several small jobs in the South of France connected to tourism. She also worked as a cartographer at her university but found it boring. She got married and followed her husband. After a short maternal leave after the birth of twins (she has three children), she convinced the director of the regional department to nominate her 'Chargée de Mission de Tourisme'. All the time she was looking for more challenges and being still in touch with professors at her university she learned about a new educational programme in 'sciences et techniques chef de projet' to which she subscribed without telling her employer. This was her first encounter with ICT and the first year was extremely difficult. Students in this distance learning programme gave each other support and encouragement. After having passed successfully her first year she convinced her employer to financially support her further training and in the end he created the position of 'Chargée de Mission TIC' for her. FF03L has started an additional training programme at her university – a DESS 'intelligence collective et management des connaissances via les communités virtuelles'. Her project is to one day open her own company. Describing her professional and private life she uses the metaphor of "adding stone upon stone to a building". ICT for her offers "l'horizon libre, non bouché'. At herself she looks as a free electron, who roams the desert all by herself, convincing others. Her husband, an engineer, works long hours. He accepts her professional ambitions but she gets no support for him in managing the family (but from her mother-in-law, a retired teacher). She often works long hours during the night when the children are asleep.

These women have clear goals and set the steps to achieve their ideas and ambitions. This may also include broader interests, such as political commitments (AF07) or artistic interests. ITF19, aged 40, works as product manager in an IT company specialised in software for health care. She is a brilliant and self-determining woman, with a marked learning orientation in her working life, always attracted by new things. Both her parents are self-employed. Her mother still manages her small business herself at the age of 71 and her strong message for her children was to be independent. After having graduated in computer science, ITF19 started working in a small company doing programming and development. When the company closed, two of the partners took the software product with them and asked her to join in, which she did. This was the start of a highly mobile but still focused career path, with seven job moves within 15 years. She recently shifted to a part-time job since she now needs the time to develop her hobby – designing jewellery from material collected on her travels around her world (stones, wood, iron) – into a real business. Images of some of her designs have already been published in a newspaper and she has contacted a shop which will sell them. At the same time she keeps a good managerial role and a good salary in the IT company and she thinks she loves too much this job to leave it. In future, she could work as free-lance consultant.

BEF07, age 38, works as a training manager for a middle-sized company that sells hardware and computer services. She chose scientific studies, at secondary and superior level, made a chemistry degree and finished her dissertation in the US. She had planned to work in the nuclear field but found this milieu closed to women. Her studies oriented her towards genetic research, but once again, young women were not admitted into the laboratories because of pregnancy risks and she was given uninteresting jobs. So she came to computers, because her grandmother, with whom she lived, had seen an advertisement about computer studies.

Although she did not feel attracted by computers and only knew rudiments, she had no difficulty in getting a degree in informatics. She first worked in an adult education project at a university and when, by chance, she contacted her present employer who was in the process of setting up an information department, she created her own job according to her ideas. She is director of the training department that counts around 10 salaried and 5 freelancers. BEF07 is divorced. She left her husband because he was present "without being there", always in front of his computer, only stopping to have meals. She has three children (7 to 11 years old) and a new boyfriend. She works around 50 hours a week but had to take part time because she needed her Wednesdays afternoons off to take care of one of her children who suffered from health problems. She was forced to agree to a cut of her wage, despite her timetable – management would not give her the flexibility she needed without going part time.

The strong will of these women to shape their own environment takes them into different directions. It includes going abroad as a single woman to be exposed to other cultures, being in charge of their own life from a quite young age on, founding their own company, carving out their own field of expertise, building things on their own, fighting for a good position. Some but not all of them come from supporting families and chose supporting partners.

Good work but limited ambitions

Several biographies exhibit rather 'normal', unexciting patterns. UKF19, aged 41, left school with poor qualifications, having moved a lot as a child. She took a one-year printing diploma course and then acquired her skills on the floor, where she learned everything, from design to the completed product. She "was the assistant who did most of the editing on-screen, in the early days of desk top publishing. She then worked as a system technician and is currently IT support specialist in a printing company. She has a strong sense of responsibility of the work, the organisation and her colleagues. It is quite gratifying for her that people respect her knowledge. She talks about not being a very ambitious person. She does not care about not being 'in the loop' when she does not participate in parts of the office culture, such as the football culture.

UKF08, 52, started as an operator, punching policy details onto metal plates, at a time when there were no computers in offices. She moved from clerical work to data entry, then to help desk support, then to payroll systems support. One thing she regrets looking back is that she didn't push herself enough to become a team leader sooner than she did. When her firm with a very friendly office culture was outsourced to one with a very serious work-oriented office culture, it took her quite a while to recreate a 'family' feeling in the office. She is happy being the team leader of a small group of three, since she does not want the extra work of continual meeting, weekend working, and constantly having to make proposals for improving the company.

These women have good qualifications and are satisfied with their work. But there are other important perspectives in life, such as having more time for their family or for hobbies. They have jobs at the lower end of the hierarchy of ICT jobs but feel competent and respected. This is also the case for FF04L, aged 40, who, together with her husband, has created their own small multimedia company. She comes from a farming family. FF04L took a one-year diploma course as a laboratory technician in physics/chemistry which included IT. She followed her husband who, more ambitious than she, wanted to get an engineering degree. She had a series of small jobs where she benefited from her ICT skills. When they created their own company, she took over the more administrative tasks, including the web, while her husband is responsible for project acquisition and programming. Meanwhile they joined a

group of companies with her husband having the position of director. For herself she has no professional ambitions. She talks about herself as 'le suiveur', the one who follows her husband. She is happy in this situation where she can support her husband and meet interesting people. She is proud of her daughter for whom she has sole responsibility. Just one regret – not knowing other countries, never having worked abroad.

Being open, having not yet arrived

These are examples of women who had a good start into working life but it is still open where they will go in the future. Most of these women are still quite young. BEF02 is 26 and married to an industrial designer. She works as a customer support engineer in a big international computer firm. She has a university degree in engineering. She has always felt interested in math and sciences and in do-it-yourself things, like her father – building models, radio controlled cars, etc. Her father works as a translator and her mother is in marketing. Her brother also chose computer studies. She early benefited from having a computer at home, while she was in primary school, thanks to her mother's job. She spent a lot of time in front of the computer as a teenager. The average age in BEF02's company is 26/27 years. Her team is nicknamed "baby team", the one where the youngest begin. The way she describes her work looks as if she continued childhood. Colleagues "baby-sit" your project when you are away; resource colleagues are named "God"; they draw lots for week-end duties; stock options dramatic loss of value was subject to laughing; changing job towards more development means wanting to "play" with devices; colleagues are mates and so are managers, except in the relationship with clients; a professional mistake is qualified as "bullshit"; work distance control is named "spying". Play activities seem to have an important role in the work atmosphere. Workers relax by playing with darts guns and last extra-professional activities were going to a circus, to a leisure park or ice-skating. BEF02 has a strong relationship with computers. Working for "a big monster that she holds in her hand", with contracts with the US government gives her a feeling of power. She does not control her working hours; it is as if "a little voice whispered to stay after 5 pm". She does not have any particular professional project, she just feels good in her job.

Some of these women are looking for alternatives without necessarily disliking ICT work, such as FF02L, whose specialty is cryptography. Her life story is full of hesitations and insecurity and time and again the idea to move into ergo-theraphy comes up. Although enthusiastic of her job and the company she works for, AF11 does not yet know where she wants to be. One of her life themes is "to be late in realising what I really want". When she is telling stories of her life, she very often ends up with "…and this came to my mind rather late" or "…as I said before, all the things I realised later". AF11 always had an interest in natural sciences, in particular biology and genetics, but she also liked languages. She finally decided to study technical mathematics. In her second job she worked as a research assistant in a project developing a virtual character that talks in gestures. The challenge was to support different views so as to be able to "look over the shoulders" of the creature. This was an eye-opener for AF11. She loved the work which also gave her the opportunity to do presentations and to be in contact with the mass media. Her current job in a small multimedia company helps broaden her interests in multimedia production. She started getting involved in the company's PR activities and is changing her role in the direction of marketing and selling. AF11 describes herself as open minded and extroverted. She loves getting in contact with people and appreciates the possibility to talk to politicians and bosses of big companies.

ITF09 works as technical assistant in a computer shop. She is very young and sensitive. Her mother has a small job, her father is retired. They give her a lot of freedom. She attended the public school of art, where she did graphic art for advertising and photography, which she enjoyed very much. She should have continued with computer-based graphic art, instruction at the school being rather old fashioned, but was too lazy. Her older brother offered her a job in his small hardware and software company, where she started answering the phone and soon learned from her brother how to assemble a PC and install software on it. Now she thinks that assembling a PC is an art, saying: "At the beginning I did not know what to do with all these cards, cables ... then when you start understanding what there is inside a computer, you start loving it and what at the beginning seems you a terrible mess you can do easily and it is very nice what you can find inside a PC". ITF09 describes herself as a lucky person because the work she does came to her, she adapted to it and found out that she actually liked it. She defines herself as a bit lazy and about her future she does not seem to have a precise idea of what she is going to do. Taking up opportunities where they offer themselves is also the dominant thread in ITF11's life story. This is a very young woman who works in the medical branch of a big electronics company where she deals with a special telemedicine project providing ICT-assisted home care to people suffering from chronic diseases. She has two young parents who trust in her, always helping her in difficult situations. She describes her meeting with ICT and with her job as a result of lucky coincidences, but in fact she is a determinate and self-reliant person. She says: "Again, fortune decided for me". Here she alludes to the fact that she happened to read about a company specialized in IT for health care offering a job related to new technologies. That got her interested. She is happy with her work but in the back of her head are other options such as her love of oriental languages and her passion for singing. She feels still open to changes, including doing something completely different.

Struggling but not giving up

In some of the life stories constraints and how women succeeded in overcoming them play a dominant role. These constraints vary – from lacking qualifications and/or a degree to suffering from adverse working conditions. FF06P, 31 years, is currently managing the multimedia service of a regional department. Her parents divorced early and she was moved from place to place. Her mother teaches French and her father is in marketing. She did her baccalaureate in biology, studied science with a specialization in environmental science. She worked in parallel in several places, including an architectural office were she prepared documents on a variety of environment-related issues. She then went to Mexico, with a self-defined project which was supported by the ministries of health, education, and the environment, conducting a campaign teaching children to be aware of water pollution. Upon her return to France she briefly taught sciences to then follow her husband to Amiens. There she started training in multimedia to give her husband the chance to find employment connected to environmental issues. She also participated in a concours (ingénieur subdivisionnaire territorial). What she finally found, with so many qualifications, was her current job as manager of a small multimedia department within the public administration. Her job involves management, administrative and also more technical function. She works with a multi-disciplinary team which she has not chosen herself and this is certainly not her dream job. She is overqualified for this type of work. She had some nasty experiences with not being accepted as a young woman and mother. It was particularly bad when she returned from maternity leave and her adjoint started mobbing her. This included not returning the dossiers on which she had worked before leaving. Her salary is not good and she often feels

very tired and worn out. To stand up for the errors of everybody is something she perceives as tough. At the same time she feels responsible and protects her team against the outside world. But she has not given up. She looks for an opportunity to change employer and she prepares for another concours (administrateur de la fonction publique). This would open the way to more interesting positions. "A mother has a tendency to neglect herself and her career", she says, and this is why she does not want to stop moving on.

FF06P is highly qualified and for family reasons she is trapped in a region with few opportunities. But she does not give in. BEF10's professional trajectory is quite chaotic. She started studying medicine but gave up soon, starting to work as a receptionist-telephonist, then as a security agent. At some point she decided to stay at home to take care of her three children. Looking for something to learn, she attended an information session about web design. Her husband first accepted her decision to start a training programme but when he realized that she got more and more independent, he could not tolerate it and hoped that, because she was pregnant, she would not be recruited at the end of her traineeship but she was. He denied her abilities and argued that she must have seduced her manager. Even her friends and family did not believe in her and could not realise that she would be hired for something else than serving coffee and answering the phone. She works as a web designer in a small web services company, the firm where she made her traineeship. The firm is very young and requires much involvement and polyvalence from its workers. She believes that in a small firm, people have to work twice more, but she likes it because she is still learning things. She does not care if the supplementary hours are not taken into account; she considers them as an opportunity to develop her competences. Her training is equivalent to three years of non-university school but is not accompanied by any diploma, which leads to certification problems on the labour market. She knows that she could earn more somewhere else (her wage is really low) but she likes her current job. BEF10 has a very positive outlook on life. She believes that things always finally end well. For example, at the beginning she did not get on well with one developer. He gave her the impression that she was not able to understand what he explained and it took some time to build trust in her competence. People believed in her competences at work, while her family doubted. At this stage, she feels happy in her job.

UKF14, aged 40, had a difficult childhood with a father who became violent to the children. She started to study for A levels while living at a friend's house where she had to pay rent so was working for money in the evenings after school, until 10pm, then doing housework at lodgings. She was unable to do homework at all. Ultimately she left school and went to work full time. UKF14 liked maths from a very young age on and she was always interested in computing, she just didn't get any chance to do anything about it. She had many small jobs to support herself, got married and was happy to stay at home for a while. Her life changed dramatically when she started a part-time return-to-study course and her husband reacted violently to this decision. She then enrolled on a 'polymath' course at a college. She remembers "walking into the room with all these people, who all looked like they were working, and I was a housewife. I thought 'Oh my god, I'll never be able to do this.' " But she could, started a degree programme in computing, later moved on to a PhD programme and started research on formal methods. At present she is senior lecturer in computing studies. She participates in a European project on software metrics and also runs a women's group. Life is not easy with the university cutting expenditure and staff and she also experienced some hostility by colleagues. UKF14 has gone a long way, surmounting not only obstacles such as lack of education, but also struggling with difficult personal relationships and in the end raising three children, financing her own education and rising to a high academic position.

Fragile or broken careers

In some cases women do not succeed in coping with the constraints they encounter. We have several cases of women who did not have a good start into working life, due to lack of qualifications and/or degree, unsatisfactory working conditions, limited job possibilities, having made a wrong career step or simply not liking to work in ICT. But they lack motivating and realistic alternatives, in some cases feeling discouraged and having failed and/or with unfulfilled ambitions.

AF05 comes from a family with no money. Her father, a construction engineer, is currently unemployed. He has worked as a project manager in different countries, in particular in Asia, and tried in-between to use his contacts for building up a trading firm (fruits, rice, etc.) but things went bad very soon. Now, at the age of 62, he can no longer find a job and is waiting for retirement. Her mother worked as a lector for a publishing house – "she was not really a lector, she would have needed an academic degree for that" – and when AF05 was born she stayed at home. After high school AF05 wanted to study architecture, but she was discouraged, having no connections to architectural practices and hearing about the long study time. Then she thought "what else"? Her father wanted her to become a pharmacist or a physician. This did not interest her and she remembered her school experience with informatics which she liked a lot. She started computer science at the University of Technology and never finished her degree. Her present and first full time job is with a service provider. Her job title is IT specialist. Her area is Internet applications, from database to passwords. When AF05 accepted her current job she made the mistake to agree with the position of 'document provider', fearing she would not find anything better. So the first step to take is to redefine her position and, as a consequence, get a salary increase. AF05 apparently was not a successful student. She, for example, never did the basic but quite difficult exams in math and electrical engineering. When she decided not to finish her degree, she felt very bad about it. All her computer skills AF05 acquired on the job but what scares her is to have nothing in her hands, should she lose her job. Although AF05 loves her work and in particular the wonderful team spirit she encountered, she describes herself as "maid for all things, because this includes everything, from watering flowers to taking care of clients". AF05 seems resigned and sad about her limited prospects in life. There is, however, a positive aspect in AF05's self image. She thinks of herself as being creative. AF05 would like to be a florist or a gardener. With some money she would build up a florist's shop, sell flowers, make arrangements. Obviously this is not an appropriate job for the daughter of a (failed) construction engineer. She can also think of studies she would like to go into, such as art history or Arabic culture – all things that she cannot afford now.

IREF03 entered the ICT sector nearly 10 years ago. Hers is a story of a woman who did not choose to enter the industry. Her educational background and personal attitudes were ones that would be incompatible with the ICT sector. By a series of accidental events, she got her first job in the industry and then moved twice. In each company, IREF03 consciously realised the cost of being in an environment she was not attracted by and, ultimately, she disliked. IREF03 has recently decided to leave the sector. She has a degree in English and history. As she recalls, she participated in computer classes that she never liked. At home, herbrother's passion for computer was balanced by her interest in books and music. After college, she did a computer course for a year but her math was not good enough. At that time her brother worked for a small company that had a contract with an Irish bank and offered her to join the company. IREF03's first encounter with the ICT sector was accidental. The content of the job was not technical; the project she worked on consisted of replacing old back-office hardware

with new computers; her brother and another guy were in charge of fixing and testing the system. Also the second project she carried out for the company had no technical content. IREF03 became project administrator but her work consisted of dealing with clients. With no future prospects and without codified technical knowledge, IREF03 accepted a friend's suggestion to apply to another company as a technical writer. In that period, the industry was booming and the company was expanding. As she recalls, the company was "hiring people continuously, they had 3 or 4 new people starting every week for the first three months". This circumstance favoured IREF03 who got the job in the company as a technical writer but "not the other job [more managerial and administrative] because I didn't know anything about computers at all when I left college, no experience at all". She describes how when people asked her to do something she had to pretend to be able to even though she had no clue about what they were talking about. In the end she was not able to cope with the technical demands of her job.

FF03P is 37. She comes from a family with artistic inclinations. As a child she moved a lot having to change school several times. She did a baccalaureate in the area of styliste/modeliste. After that she studied PR and graphic arts for four years. She started working in several small publishing houses and in parallel in her own studio. Then she got married, had two children and moved with her husband to the countryside with a farming project that involved restoring an old farm house. After the birth of her second child she had severe health problems and she is partly disabled now. She decided to reorient her career in order to make it easier for her husband to find a job (they have the same background). This is why she started a series of short internships where she received training in web design. She now works as a web mistress responsible for three web sites. She is not happy about her work since it does not offer any challenges and her salary is about a third of what it would be in PR. This is a job in which she cannot unfold her potential. She would like to do more programming, something that in her company is the domain of men. But her job situation allows her to take care of her two children while her husband works on the farm. "Chez nous l'inactivité tue", she says.

Male biographies

This chapter describes the profiles of our 33 male informants based on the key data covering age, family status, job/tasks, and education. Because of the small number of interviewees, information obtained from the coding scheme has not been included in the analysis. For more detailed information see tables in Annex 2F. The emerging profiles together with an analysis of the narrative interview material allow a cautious summary evaluation of male biographies.

Age, partners and children

The men interviewed are on average 38 years old. Most of them (21 men) are between 31 and 40 (see Table 23).

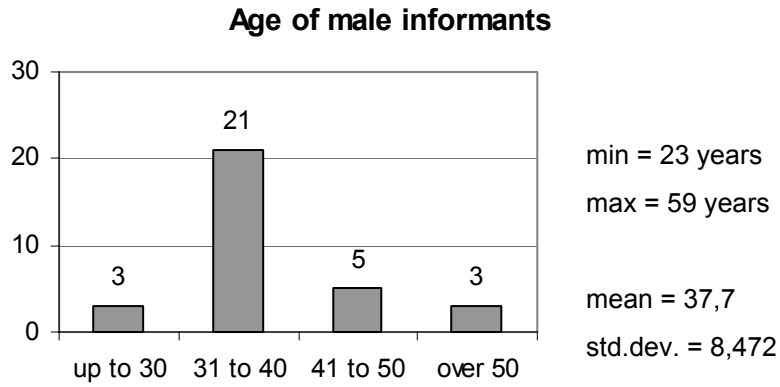
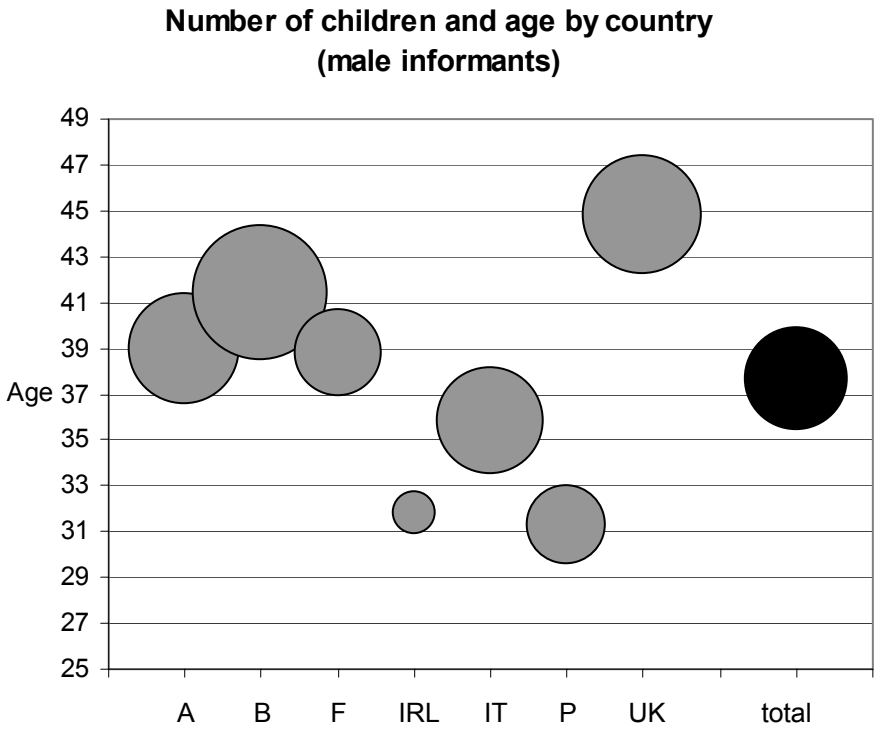


Table 23: Age of male informants – frequencies, n = 32 men

27 of male informants (82%) have a partner and eleven have no children. Table 24 gives an overview of the number of children and age of male informants for each country. In the UK the average age of male informants is highest, whereas many of the younger men come from Portugal. The male informants have on average 1,1 children, 1,8 in Belgium. Three of the Belgian men have two children, one has three children. In Ireland only one of the male informants has one child. Most of the men with children have at least one child who is still under 14. Only two of the interviewees in Belgium and two in the UK have grown up children.



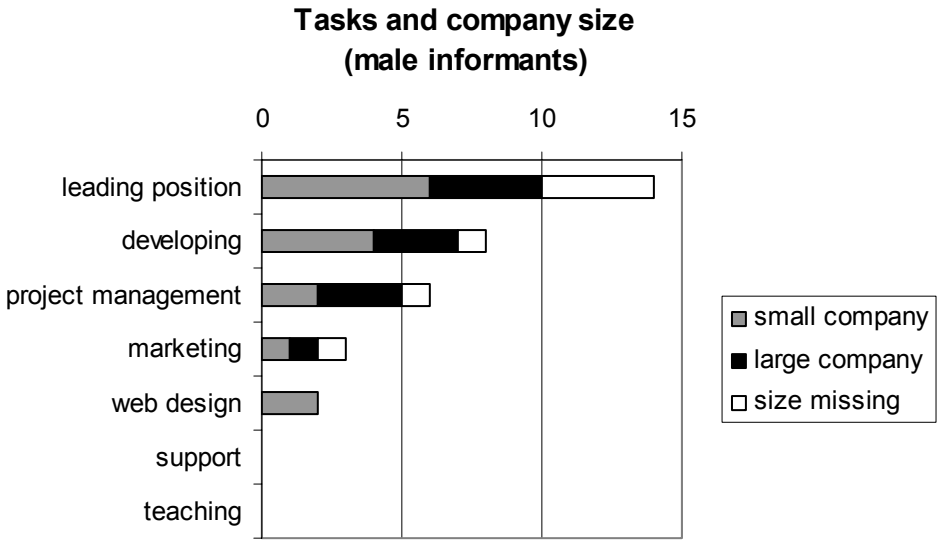
	A	B	F	IRL	IT	P	UK	total
average age	39,0	41,4	38,8	31,8	35,8	31,3	44,8	37,7
average number of children (corresponding to the size of the bubble)	1,3	1,8	0,8	0,2	1,2	0,7	1,4	1,1

Table 24: Average age and average number of children for male informants in each country, n = 31 men

Jobs, tasks and companies

14 of our male informants are in *leading positions*, seven of them self-employed or company owners (see Table 25). Three of the self-employed men have founded their own company, either alone or with a partner/associate. This includes one case of a CEO of an Italian company which was built up together with friends, one CEO of a small multimedia company in Austria, and one man from Portugal who provides technical assistance in IT customer support with his own firm. Four of the cases (2 in Austria, one in the UK, one in Belgium) are single-person start-up companies.

Two informants from the UK are in a leading position, a director for external relations in an e-Centre, and the business development director of an electronic commerce trade association. One of the French informants works as researcher at a university where he is also in charge of the organisation of e-learning courses for a psychology department. One Belgian informant works as general manager in a small desk furniture and computer supplies company of 60 employees. The remaining three informants in leading positions work in big companies: the manager of software engineering teams (supervising nine people) in Ireland, the leader of a team of 20 people in the IT department of an Austrian broadcasting corporation, and the technical director of a big software company in Portugal.



	small company	large company	size missing	total
leading position / university + single-person company in IT	6	4	4	14
developing / programming	4	3	1	8
project management + head of internal department	2	3	1	6
marketing / public and business relations	1	1	1	3
web design + graphic designer / Internet journalist	2			2
support / administration / helpdesk				0
teaching				0
total	15	11	7	33

Table 25: Tasks and company size for male informants (in the order of frequencies), n = 33 men

Eight of our male informants work in *developing*, four of them in small companies. One of them is a self-employed IT contractor in the UK and currently works for a US bank. Three of the male developers work for large companies in Ireland (two of them in a telecommunication company, one in a steel trace).

Six men have *project management positions*. One of them is telecommunications manager in a call centre in France, one in a European software company with around 70 workers, one in a software house in Italy. Furthermore two informants are managing projects in small firms and three others in large companies. One of them works as a legacy order manager in the UK for a big computer service provider, one does the radio frequency planning for an electronic company in Italy, one works at a broadcasting corporation in Austria and is responsible for the development of databases.

Three men work in *marketing*. Of those one is marketing manager for Europe based in a big software company in Ireland, one is sales director for a small computer service provider in France, and the third one is responsible for the acquisition of new clients for a communication agency in France.

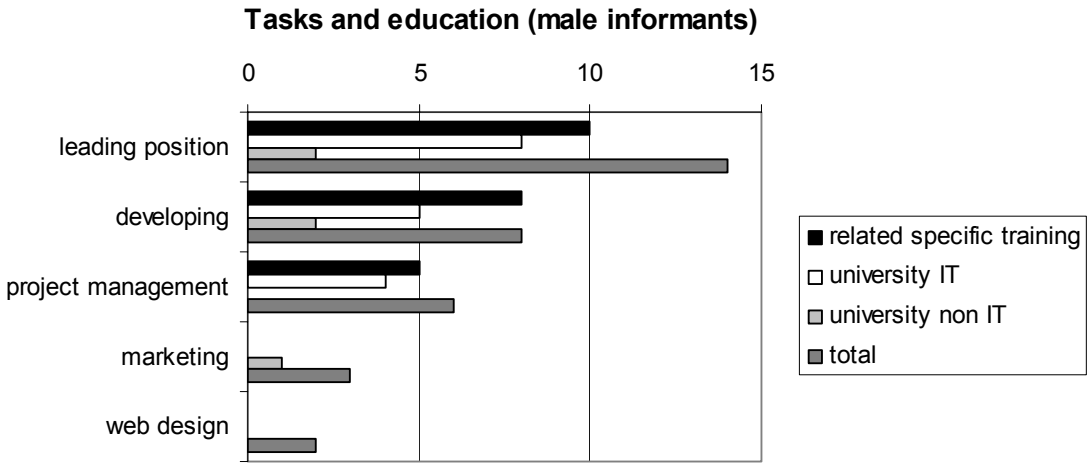
Two of our male informants work in *web design*. They are both in small companies, one in Belgium in a software company that also sells hardware, one in Italy who works in his own company with some of his friends as freelance collaborators. None of our male informants work in support or teaching.

Overall there are nine men who are *self-employed*. The seven, who have leading positions, have been described above. Of the remaining two one develops IT security systems as IT contractor and currently works as Chief Security Architect for a US bank in the UK and the other one built his own web design company in Italy.

The majority of the men's companies (15 cases) are in the ICT sector, in the area of software, consulting, system house and IT services. Three of the men work in hardware companies, five for telecommunication companies and Internet providers, and one at a university. One man in Italy works as web master, web designer and "digital animator" together with some friends in his own company. Six of our male informants work in non IT companies: two Austrians work for a broadcasting corporation, one of the Irish informants in a steel trace, an Italian informant in a bio energy society, and in the UK one in a US bank and two in trade associations.

24 of our male informants have been working in ICT from the start. Nine had other jobs. While in 18 cases the men still work with their first employer, 15 changed job/employer more than once.

Education and qualification



	related specific training	university IT + related	university non IT	total per task
leading position / university + single-person company in IT	10	8	2	14
developing / programming	8	5	2	8
project management + head of internal department	5	4		6
marketing / public and business relations			1	3
web design + graphic designer / journalist				2
total	23	17	5	33

Table 26: Tasks and education (male informants) - frequencies, n = 33 men

23 of the men have related specific initial training in ICT (see Table 26), 17 of them a university degree in IT or related subjects. There are five men who have a university degree in a non IT subject: one has a degree in geology, one is working in marketing and has a degree in law. The other non IT university degrees are held by men who nevertheless also have training in IT. One has a science degree, one has a university degree as an expert surveyor. One male informant holds a university degree in IT and an MA from the US in "charging and billing".

Male biographies – are they different?

- Male and female biographies in computing and ICT do not differ radically. However, the men seem more mobile and at the same time less passionate and ambitious than our female informants. The women we interviewed have more articulate lives and other important interests beyond computing.
- Men's entry routes into computing are often through science subjects but there are also several re-orientation careers, with the men coming from economics, business, ethnology, law, and even clothing design.
- Building one's own work environment is a particularly strong motive amongst men (6 out of 33). In most cases this resonates with being on their own and primarily accomplishing themselves. Among them are:
    - The director of a small multimedia company with a strong academic background (A) – he sees himself as taking care (of his family, his staff) and wants to lead a whole life, combining the world of academia, business, and family life.
    - The owner of a small product company (UK) – a man with a chemical engineering background, used to building his knowledge (of ICT, of an application area) on the job, who developed and now sells his own product, working at the same time as a management consultant.
    - An IT analyst (BE) – a former expert surveyor, who always wanted to have his own business, found programming boring and now manages a company of 60 employees.
    - An ethnologist and IT specialist (F) – with a background in AI/linguistic IT, who combines the jobs of researcher, teacher, and network administrator at a university institute with work for a small, independent service company within the university which he has co-founded with several others.
- Being independent is a motive that we did not find in this form in women's biographies:
    - A freelance developer with a background in engineering and psychology who currently manages a huge project (A) – his choices are highly motivated by his need of freedom. He would not accept any job that implies time restrictions or control mechanisms, even if he could earn much money. This is reflected in his personal life where he also tries to live with a minimum of commitments.
    - Project manager in a large TV company (A) – his authoritarian father wanted him to become a lawyer, he never took a degree, sees himself as a specialist and a generalist at the same time, plays music in a band, and has an almost hedonistic attitude towards life.
- For some of the men working in ICT is an extension of their hobby. These men have a bricolage approach to technology (tinkering instead of analyzing) and (in one case) to developing their own company:
    - The owner of a very small provider company with a background in IT (A) – who is not an entrepreneur nor a technical innovator but just managed to turn

his passion into something profitable. He does not have a vision for his small company and he leads it in a rather hands-on way.

  - The head of an IT department (A) – whose passion for computers was always there but who took a detour via advertising and marketing, creating his own firm around a collection of wedding dresses.
  - A freelance analyst/developer (BE) – who came to computers on the job, always having tinkered around, the fact that he does not have a degree does not bother him today.
  - An analyst/developer (BE) – whose only hobby is computing and who dislikes the people he is working with.

- Inter-company mobility seems to be more taken for granted by men and several of our informants held a number of highly qualified and interesting jobs, such as:
  - The owner of a small product company (UK) – who held several engineering jobs, always learning a lot on the job and leaving when there were no more challenges.
  - An electronic engineer who works for a telecommunications company (F) – he comes from a working class family, has always been tinkering around, after graduation worked in several small engineering projects and is changing jobs to have the opportunity for learning and foster his professional recognition amongst his co-workers.
- The family and in particular fathers play a different role in the men's biographies than in those of the women. Fathers (or grandfathers) appear in these stories as much admired 'images' – the mechanical engineer, the entrepreneur, the lawyer, the garage mechanic, the father who installed the first computer in his firm – rather than parents who encouraged or gave support.
- While a number of women mentions that they stand back so that their partner can have a career, the men (with a few exceptions) typically refer to their partners as being available in the background, taking care of the children and/or also giving professional advice. As is the case, for example, with
  - The owner of a small provider company, who is married to a computer scientist who no longer wants to neither program nor have much to do with technical stuff. He finds a lot of support in his wife, who not only does the bookkeeping, but is a partner for discussions, helping him to take decisions. He always hears her opinion.
  - The ethnologist and ICT specialist (F) – who talks about himself as "on fait partie de la belle catégorie des irresponsables", with his partner having adapted her ambitions and working hours so that she can take care of their small son, since "si elle devait avoir le meme rythme, ce ne serait pas possible".
- As a consequence, while for the women work-life balance is a topic (whether they have children or not), this is not the case for male informants.

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Biographical Interviews – Synthesis Report Austria

Introduction

The aim of a biographical interview is to develop an understanding of a person's biography or trajectory – her development as based on opportunities, choices, and individual coping strategies. Main concepts for our interviews were 'life themes' (Thomae 1996), strategies, turning points (detours, transitions), and crucial significant others. Our interview technique was partly pre-structured, partly narrative, partly stimulating reflection (what Flick 1995 calls episodic interviews with a strong narrative character). The focus was on the women's work biographies, with an understanding that these are inseparable from their identity and concept of a good life. Silvia Gherardi's narratives of "women travellers in a male world" come closest to the notion of biographical interviews, the concepts that shaped her reading of the women's narratives being "the presence of a common plot, the outsider, the journey, the unexpected encounter with the different" (Gherardi 1996, p. 190).

We interviewed 15 women and 5 men. The following table provides an overview of our informants.

CODE	SHORT DESCRIPTION	AGE	PRESENT JOB/COMPANY
AF01	AF01 has made a career in a big firm offering her the possibility to go abroad. She is motivated by interest in all kinds of things, especially foreign cultures.	45	Technology manager, automation and simulation Steel producer
AF02	brother as an idol, young, enthusiastic, open, happy in her job/position, happy with team (=important), lack of degree "nags"	29	IT specialist Employed by a software company, leased to IT department of TV station
AF03	Young woman at the beginning of her career feeling enthusiastic about her work and proud of having achieved the education at the HTL, keen on learning more.	22	Junior programmer Software company
AF04	from the countryside, large family, moving out of her milieu -> city, salary, status, technical environment and bank = rising status, no professional education -> change not possible, age 45, has reached the ceiling	45	Programmer IT department of a large bank
AF05	A timid young woman who basically enjoys computer work but has resigned, thinking of herself as a failure, with dreams about doing something creative.	31	IT specialist in the area of Internet applications (from database to passwords) IT service provider
AF06	A young woman, who is very active and engaged in her working life, dealing with the organisation and management aspects of work rather than with technical ones, who has gained self-confidence through successes.	27	organisation of courses and seminars in IT self-employed
AF07	The co-founder of a small software company who successfully shaped her own work environment, from a supportive and 'happy' family, an independent woman, politically engaged, a woman who loves solving problems	37	Director of finances and software development, Small software company developing specialized standard software with a consulting aspect

AF08	University career, tough, +own enterprise, workaholic, mobbing victim, high interest in maths, supportive parents/partner, success/career	43	Associate Professor, University
AF09	AF09 has made a career that is typical for scientists in technical domains. She deals with performance analysis and is now head of an institute. She is very engaged and ambitious.	35	University Professor, head of Institute
AF10	Young woman from rural background with impressive scientific career, having reached the position that fits her competences and ambitions, who combines a holistic approach to the design of information system with a personal life in different roles	34	Associate Professor, University
AF11	Likes open work environments for her development, "open" person, changes possible	31	project acquisition, communication small multimedia company
AF12	AF12 is a very ambitious woman, but very unsure about herself. She is very much driven by acknowledgement she needs from others. She has achieved a lot, but struggles a lot with herself and her relationship to technology.	30	section manager corporate applications electronics company producing microchips
AF13	A highly professional young woman who likes taking initiatives, is critical and reflective	27	Project manager, Software development and support company
AF14	AF14 comes from the countryside. She studied commercial sciences and wanted to work in sales in IT and that's what she achieved. She is quite straightforward.	36	channel manager Software company
AF15	A quite balanced young woman who has found what she wants to do and is enthusiastic about her work, open to change	27	Network support and training, IT training programme for women
AM01	Moved from academia to head of multimedia company, sees himself as building things, taking care (of his staff, of his family) and leading a 'whole life'		Co-founder and CEO of a small multimedia company
AM02	workaholic, freak, independent, supportive partner, lucky entrepreneur (without much know-how)	32	self-employed Internet provider, IT services
AM03	self-employed and independent, wants to know how things work, shapes his own environment (= very important = freedom)	51	self-employed project leader and network administrator
AM04	fond of programming, being independent (as person) shaping his own environment	38	project manager IT broadcasting company
AM05	AM05 turned his hobby of computing into a profession and is proud to work for a broadcasting company.	35	group leader of the computer centre of a broadcasting company

Our analysis attempts at preserving the biographical aspect of informants' narratives while at the same time looking at more general patterns across individual biographies. Our strategy was to:

- First look for commonalities in women's biographies, grouping them in five categories, describing and analysing the patterns we found in each category.

- Search the material for experiences that cut across individual biographies that allow a more general view of women's situation in IT, namely of the diversity of backgrounds and career paths, of jobs and working conditions in the field, and the role of gender.

- Finally, look at the five men's biographies, trying to read them in comparison to those of the women.

Biographical patterns

The categories we use in our analysis of biographical patterns are not theory-based but empirical, grounded in the material itself. They reflect some of the colour the women themselves gave to their narratives. They can be roughly characterized as follows:

- *Building one's own environment*: These are engaged, successful, and self-conscious women, with supporting families and partners. Work occupies a central role in their life and their career steps reflect their goals and ambitions.

- *Single minded careers in math and technology*: These women embarked on a rather straight career in a technical field. They are extremely hard-working and love problem-solving as an intellectual challenge. They accept the conditions for being successful in the IT sector and some strive to the top.

- *From the margins to a job in the core*: These women learned to be independent early on, some of them grew up with boys, and they were not exposed to the role-specific clichés concerning technology. They have seized the opportunity to move out from their milieu to which they are still very attached, getting independent and broadening their horizons.

- *Fragile or broken careers:* These women's chances to have a career in the IT sector are limited. Some of them have not chosen IT as a career but happen to be there, others have not finished their degree. These women feel constrained and often discouraged. There may be unfulfilled aspirations but also a lack of an attractive and realistic alternative.

- *Having not yet arrived, being open*: These women had a good start into working life but are not yet set on a career path, not knowing where to go. Some of them have realistic alternatives, such as continuing their education or career opportunities in another field.

Building one's own environment

The four women which fit into this pattern all come from supportive families. AF01's parents are both elementary school teachers – "out of passion" and they have instilled in her a love for learning. Also AF13 comes from a family of teachers. She thinks that it was her father who encouraged her to engage with computer. She also remembers having played computer games with her girl friend and that this was a lot of fun. So with her own money she bought herself a used Commodore 64 and taught herself programming. The person who influenced her most was her mother whom she describes as

> a strong woman and oriented towards feminism, and she for sure created the basis for this, she is rather success oriented, and this was an incentive, I think it meant stress on the one hand but also an incentive.

AF07's father works as a house painter, her mother did office work but then stayed at home to look after her three children. She talks about having had a happy childhood with caring parents with whom she still has a very positive relationship. The central person in her life has been her mother, who although having given up her own career for her family encouraged her strongly to do it differently, to get a good education and to focus on her work.

The father of AF06 worked as an engineer and later on in the export management of a big international company specialising in gas engines. Rather late he started to realise his professional dreams. "And that's what he does now: He designs houses for a living." Her mother, whom she seems to admire, "did all kinds of things" from working as a sales woman for cosmetic products managing the region of Western Austria to running a health food shop.

All four women decided for themselves what to do for a career. While AF01 and AF07 were headed from the beginning towards a technical occupation, A06 and A13 made some detours which we will describe later. What stands out in the four biographies is the women's determination to shape their own life.

AF07 has founded her own software company, together with the adviser of her thesis. Looking back she says:

> To be able to determine things yourself, this is what is possible when you develop your own company … and I love developing software … you can cope with a lot of stress when you love your work, and it is simply exciting to be able to participate in decisions.

Being in charge of her own life is AF07's main life theme. She remembers that this was so when she was a young child:

> I would have loved to move to my own place when I was 15 … but at that time my parents would have been too nervous, to let me go when I was just 15. But this was clear that after graduating from school I would go my own way und that there are things I do not discuss with my parents. I am the type, there was no conflict, just to define your boundaries, this is my life, this is your life, and we are doing things together …. I think I must have been a difficult youngster, I was always independent, wanting to do things myself, telling my mother: 'I don't want your help with my homework, I do it myself'.

AF07 perceives herself as having created the environment for herself, in which she feels comfortable. This includes work as well as her private life of friends and family. This was not easy – "a tough struggle for some years" – before she was able to see things in proportion.

AF06 did not have such a speedy start into independence. It took her a long time to find out what she wanted to do, hating physics and math, which deterred her from choosing her favourite subject architecture, going into journalism, which she now sees as a wrong choice. Life changed for her when she and a girl friend heard about the Internet. They started hanging around in the university's computer lab for hours, reading a lot of things and "somehow dropped into that computer stuff". They started to do web design. AF06 applied for a job at a web agency and was employed for a project developing a web site for the Austrian government offering information and help to the public on different aspects of living and working in Austria. After having quit that job she came across an association of women promoting Internet access for women. She immediately got very active in that association. She did their web site on a honorary basis and worked as a trainer. The opportunity to out her CV on their web site helped her to acquire other customers. In 1999 the association had the

idea to create a web academy with courses for women on the Internet and computers. This developed into her project. At their best times the web academy offered more than 20 different courses and had a pool of more than 30 female trainers.

Also AF13 took several detours – a 2-year training course in Tourism and Management and work as a marketing person in a small vendor company – before deciding to get a degree in 'commercial informatics'. After having graduated she fought for the position she has now and for a good salary. The way she negotiated her present job illustrates her determination to arrange things so that they fit her ambitions. She describes it as

> You need to want something and you need to know what you want and you have to focus on it and work for it … yes of course I was lucky that the conditions were fine and that I had a boss who gave me support, knew my skills and my strengths and weaknesses and gave me the opportunity to develop my potential.

She also carved out her own field of expertise which is project management and quality assurance. She is particularly proud of having introduced a project management process model (CMM) in her company. Currently she is involved in an EU project on engineering processes together with a university. She proudly mentions, "I am the only one in the company" who engages in these types of activities.

AF13 describes herself as an organizer:

> When I was a child I started organizing and planning my holidays and I don't know what kind of activities, organize parties, going out with tents, and even tried to found an association, when I was a child, which did not succeed because no one was interested, volleyball or something with sports.

She adds:

> I always had the feeling I will run things and manage, this success thing I believe comes from my mother.

AF01's story is special. After graduating in technical mathematics she went to Japan with a scholarship where she worked for 1 1/2 years as a research assistant at Tokyo University. This was 20 years ago, at a time when it was far from usual to go to Japan. What motivated her was curiosity. The 12 hour flight was a journey from home – she still lived with her parents – into another culture and into independence. Back in Austria she looked for a job that would allow her to work abroad. This is how she found her first job in the steel company where she was immediately sent to South Korea with the task "to design, model, program, and implement process models", more precisely quality monitoring systems. This was quite a challenge.

AF01 tells the story of a visit to one of the world's largest steel producers in South Korea, where she arrived as probably the first woman in a technical position. She came with two of her male colleagues to fine tune the technical specifications and carry out some modifications. The first thing was to make a meeting plan for the next days, something that normally is done by the boss. As she was experienced in communicating in such an environment, she simply took over. After each break, she remembers

> There were more and more Koreans at the other side of the large meeting table. It was obvious that they went back into their offices saying: 'Come, join in the meeting, there is a Western woman'. And in the end there were, 16 or 17 or 20, no but surely 15 people.

She describes the amazement of people that "a foreigner with big eyes and blond hair speaks their language", stressing that she never felt compelled to comply with people's notion of a

modern woman. This and the "I try to preserve my identity also regarding how I dress" signals AF01's self-confidence – she does not need to dress up.

Interestingly, all four women are highly self-conscious as women and two of them have been or are active in the women's movement. For AF06, who is still engaged with a women's training centre, discovering women's studies meant an important turning point in her life. She took it as her second study subject and is now about to finish her master thesis on women in leading positions in the IT industry. AF07 became engaged in the peace movement and the women's movement as a student – "a conscious woman". There she always met other women, somewhat older than her, who gave her support, encouraging her to go her own way. This made her gain her self-confidence which she tried to transfer to other, younger women and girls, mainly as part of her work in a youth centre. AF13 talks about patriarchal structures and about decisions being taken by men. Already at college women were a minority. AF13 tried to get to know more women from IT and got involved in a women's training centre and another association where she organized a panel on 'Women in IT'. She is regional coordinator of the training centre and sits on its board. She also acts as shop steward in her company. AF01 seems less political. Feeling not sufficiently respected as a women professional is intertwined with her love for and engagement with 'othernesses'. She refers to her experiences with male colleagues who behave "like tractors" and who generally assume that in other countries women are treated much worse than in Austria. Her descriptions are full of implicit hints at men who are different, who don't share what she deems valuable. She sees men as fiddling around with details, as looking down upon users in a disdainful way, and she gets angry when talking about men using female terms when characterizing computers.

What the women also seem to have in common are supporting partners. AF01's husband followed her to her position at the steel company and he has an equal share in looking after their 12-year old son. When AF07 had her child, her partner, a former social worker who recently retrained and now works as an internal SAP consultant for the city council, switched to working a lot at home. However, this also involves conflict:

> He does not enjoy my having my own company. And he really got more than his share those last years, with being responsible for our child and housekeeping. … I am fortunate that he accepted this but I would have expected that he takes over his 50%. But it is not easy since he renounced to much more than I.

The partner of AF13 went to a vocational high school for electronics which he did not complete and then got apprenticed as a machine fitter. It was her mother who gave him the idea to work for a university entrance exam. Both of them went to Vienna together and she motivated him to move into IT, helping him to get a job:

> We get along very well together, he gives me a lot of support and also the feeling that what I do is great, and this is important. Yes someone who gives me the feeling that he is proud of me and my success.

Several things stand out in these biographies that almost sound like model biographies of strong and successful women in a technical field:

- A supporting private environment – parents, in particular mothers, who serve as role models, are admired by their daughter, give encouragement and support, together with a choice of partners who take their share of household duties and child care and are proud of their wives.

- A strong will of the women to shape their own environment – this includes going abroad as a single woman to be exposed to other cultures, being in charge of their own life from a

quite young age on, founding their own company, carving out their own field of expertise, building things on their own, fighting for a good position.

- Being aware of the disadvantages of women and (in some cases) engaging in providing training and other kinds of support for women.

Single minded careers in math and technology

Only two of our informants have embarked on a single-minded academic career in math and technology. They are not less independent then the other women we described but the overarching motivation behind their careers is somewhat different and maybe special of women in academia.

AF08 talks about her parents as supportive and tolerant. Her father studied architecture, but worked "as a paper-hanger and decorator" in his own enterprise. Her mother stayed at home to look after her children. Her parents both encouraged her to choose a technical subject. AF08 has always been interested in mathematics at school. She describes her parents as the contrary of "…you have to…" They always gave her encouragement. AF08 studied informatics but she had doubts very soon. She felt insecure about her choice, and although she liked learning all the theoretical stuff, she was not sure if it offered an attractive professional perspective. In this personal crisis she started to study architecture as well. That was how she met her husband and soon became pregnant. Because of her pregnancy AF08 gave up her studies of architecture, very quickly finished her degree in informatics and started to work in hospitals as a database consultant. She describes her first job with "always having the baby in my arms". Soon after that she got a university position and successfully climbed the academic career ladder until she started to apply for professorship positions, without success. This was one of the reasons why she looked for an alternative. So, in 1997 she founded her own small company, a so called "spin off". In the meantime there are 25 people working there, and the fight of the first years seemed to be have been worth it.

AF09 grew up as an only child. Her mother had worked as a secretary but gave up her job when she was born. Her father worked in the planning of petrol stations. Her parents always were very supportive and she still has a very good relationship with them.

> I don't know how they did it, but they always had the right degree of leaving freedom but giving support. So they accepted all my decisions in any case, this was out of question. And in retrospect I realise that they sometimes did not fully agree, and then we simply discussed it. ... They just found that I am a rational person and that it must be possible to discuss everything.

She always preferred boys' games like Lego and playing football. When she was playing with her Barbie doll, she constructed things for her using the Lego blocks. Performance has always been important to her. She remembers how proud her family was when she received good grades, what she always did. Her ambition is unbroken.

> I am still very ambitious. Only to be average is not enough for me.

After finishing her studies she stepped right into a typical academic career. Beginning with her master thesis, than for her dissertation, and later for her postdoctoral degree (Habilitation) she worked on different aspects of performance analysis of parallel and distributed systems. After a short interlude as a professor in the Netherlands she got an offer at an Austrian university. Her main focus has been and still is performance analysis, that is where she knows the tools that she has once learned and is now applying. What is changing are the areas of

application. Although quite young, she has arrived at the top of the academic hierarchy. Her view of her career is:

> I never really consciously planned my career, that's what I have to say actually, but it all came about step by step, nearly by itself.

What both women like about their discipline is its problem solving, analytical aspect. In the words of AF09:

> Those validations, when you see, that you have finally understood the process, that you can describe it in a model that is consistent. This gives satisfaction. … This understanding of the world in miniature is simply fun, yes.

So what she likes about her work is "solving riddles and generally the curiosity to get to the bottom of things". The scientific environment is very well suited to her.

> In our profession you can't take anything for granted. All that we read, we should and have to question and analyze. And what I also like about science is that even a 'no', a failure can be a good answer. … And this is somehow this freedom, that is fascinating for me, simply to approach things without any burdens, that are just right now exciting and interesting and worth being investigated, without the pressure that there immediately has to be the idea for a product, commercial use or implementation.

AF08 sees the ability to switch from one task to another as one of her talents. There is a striking affinity between her self-characterization as a "parallel person" and her field of work which is "parallel processing".

There are interesting differences between these two academically successful women. AF08 describes herself as a victim of mobbing. Her colleagues seem to have given her a hard time. She stayed, fighting it out. Moreover, she did not really feel appreciated for her academic work. The patent she is holding "counts zero points". This is why she looked for an alternative making money out the theoretical work. AF08 talks about her enterprise as her third child and about herself as the "technical mastermind".

> I am the one watching if the ship is going into the right direction. I keep my influence on communication and internal processes. Technology is one thing, but communication is terribly important.

For AF08 it was important to do something others don't. Lacking the recognition she thinks she deserves, to be highly appreciative of others is one of her leitmotifs. For instance, she is convinced that the excellence of her team is due to this mutual appreciation:

> They are all grown-ups, highly qualified, there is no hierarchy. They are all self organizing team workers, I don't have to control them. There are very few problems they cannot solve on their own and where they have to ask me.

One AF09's life themes is 'standing out'. It becomes visible in how she describes herself as a remarkably tall child or an excellent student. She talks about herself as having been a tomboy, playing football and the like. Standing out is also what she does in the scientific community. She never felt out of place but being a woman contributes to this experience of standing out. Being a woman

> … absolutely is a topic and sometimes it is simply fun to cause a sensation in this male world.

It amuses her to see the reactions of surprise when male colleagues that haven't met her before realize that she is a woman and moreover a young woman. One of her fantasies when attending an academic ceremony was:

> They all strode in, in their fur coats, and this was such a male clan, and as the only woman the vice rector for personnel, and that's when I thought, to be on top there, this could be a goal.

Both women are extremely hard working. For AF09 work is almost like a drug and even things like arranging for a visit to the theatre are difficult to fit into her day:

> It is a challenge and also a little like a drug. So I really draw pleasure out of work, when I see, that you are successful. Of course, when you don't succeed, it is even worse, nearly like withdrawal symptoms, yes, so that's when you can get quite depressed. … So when I don't have to do much, I don't feel well. Whereas when I have a lot of things to do, I am actually happy. Insofar I think that I am predestined for this job.

AF09 has a broad field of interests, having learned to play the guitar and to do massages. In her spare time she used to knit. Now she only manages to do little socks for babies when one of her friends has a new child. She manages the web site for a sporting community.

AF08 works about 80 hours a week. She regrets that she does not have enough time for her family, especially for her two children. She would not be able to manage without her husband, an academic himself. She talks about her present situation as one of "temporary extermination" and does not want it to become "a method" in her life.

Two things stand out in the biographies of these two academic women:

- They follow a clear career model and strive to the top. The conditions for doing so – a hierarchical structure, a competitive environment and long working hours - are accepted. Being a woman is not a topic in these women's biography, moving in a male world and being successful in it is taken almost for granted.

- They are single-minded, taking extreme pleasure in mastering the intellectual challenges of their discipline, and strive to the top.

From the margins to a job in the core

Five of our informants grew up in the countryside. This has been a strong shaping force in their biographies. First of all, growing up on a farm (which four of the women did) helps children, also girls, get independent very soon. Moreover, technology is much more accessible to girls than in the city.

AF03 was raised by her mother without any support, her father having died when she was eleven. She grew up with lots of boys around her and only few relationships to girls.

> As a child I always wanted to have a 'Fischer Technik' and, yes, this is not what girls play with. And it took two years before I got it. This is something that for sure never broke and no one else was allowed to touch it. This was only mine.

After having finished secondary school, she went to a vocational technical high school (HTL) where she participated in the 'IT and organisation' programme. For a young girl from the countryside this was a quite unusual choice. But she always had liked mathematics and her math teacher at school talked to her mother, arguing that she could do it because she is so quick in understanding things. Her mother already had selected a vocational school for women:

> She wanted me to become a housekeeper. And this I absolutely refused. And then I started looking around myself and this came to my mind, and then I did it.

For sure the mother was the one who had to face the neighbours' comments:

> This is what my mother had to face: 'What shall she do afterwards? What will become of her?' But I didn't mind because I was not aware, and I don't mind now. And now its more 'big eyes' since no one had imagined that I'd finish this.

Everyone around her asked "are girls admitted at all?" In the end she was the only one from her class who went to the HTL, which was a strange experience at the age of 14, but people "were impressed"; and in fact there were only two other girls in her year group at the HTL.

Other women were not so lucky to have a HTL in the area. AF10 comes from a family of farmers with five children. She has an older sister and "should have been a boy":

> I have grown up in freedom, did not have these duties like helping mum with the housework, but was with my brothers – my younger siblings are boys – playing with them and was a lot with my father and therefore in touch with technology… I did not care for dolls.

She is the only one from her family with an academic degree. As a girl from the countryside she went to secondary school where she was tested for a special aptitude for technical occupations. She talks about this as "a recommendation that was not taken seriously". Her parents sent her to a vocational school with a business administration focus. She was good in math and physics, had a strong interest in "logical thinking, formulas, geometry, rules", and enjoyed everything that came close to these interests in school, such as accounting and programming. After graduating she accepted a clerical job in a steel company and after that in a computer company. After four years of work experience she was already financially and intellectually independent from her family and took the decision to study informatics:

> I was sure of what I wanted to do and did not discuss it at home … I knew, I will do this, and they accepted it, I always had my own way.

AF15 comes from a family of farmers in 'an economically disadvantaged area. She grew up with three sisters, learning to be independent since when she came home from school her parents were often working. She took care of her youngest sister helping her with her home work.

> When things broke, a wheel or so, than I mended it myself or together with my sisters, since if we had waited for our dad, then nothing would have happened, since he had little time and almost never was at home – my education, it was my mother who was in charge of my education, he almost not – and since he is someone who always postpones things …

And as there was no brother

> I was not scared of these things (things to repair) and was able to manage equipment such as screw driver and drill.

There is a strong will to seize any opportunity to move out from one's milieu in these women. AF04, for example, comes from the countryside, from a family with 6 children. After secondary school she went to a 2-year agricultural school, and having finished her apprenticeship she worked on her parents' farm until she was 20. This didn't interest her. Very early she knew that she wanted to move to the city:

> It was clear to me that I wouldn't be able to create a living in the countryside, it was clear that I had to leave since I have five siblings.

She tried to find something different from a normal office job, to do something a little more demanding, and get a good salary:

> In IT salaries are good and you don't need an academic degree to reach a certain level and climb up a career ladder, move up in the hierarchy to earn a good salary. When you are a

> specialist you earn a certain amount. This was a strong motivation for me, yes these two things, to have a job that hopefully never gets boring and that gives you a good salary.

At that time there were no IT schools and AF04 started in a small to middle-sized trading and production company where she stayed for seven years. Although she had no background in IT, she managed the transition from manual to IT supported work in the office. She talks about the ways office work was organized 20 years ago in such a company. It included everything, from short-hand to typing, accounting, and skilled clerical work:

> We were 4, 5 women in this office, two at the phone, one did the correspondence, one was the accountant, and I did the computer system. … Of course I knew at that time what I did and it was something that always had interested me. They told me that this is an IT job … and I took evening classes to build up basic knowledge.

She describes her work:

> In such a small company IT is something very small, this was just two terminals and a printer … for orders and accounting, just these things. And I learned the operating and programming, this was not difficult, because I took a couple of courses at the software company, and that was it.

The main reason for looking for another job was that AF04 wanted to develop herself, learn something new, "become more professional":

> There is a different level of professionalism in a larger company … there is also a difference concerning the type of machine – it is much more interesting to work on a large computer installation.

Another important aspect of her current position is the respectability of working in a bank. This is a stable environment that offers a variety of fringe benefits for its employees – they reach from six weeks of paid vacation and daily lunch in the cafeteria to a place in a nearby kindergarten and a parking lot. The fact of working in the city centre adds to the attractiveness of her present work.

AF04 has achieved what was possible for a woman from the countryside with no high school diploma. If she had had the opportunity to go to university, she would have chosen the sciences and an academic career. She would also be interested in product development within a technical company. Her future at the bank is not entirely secure and of course she has thought about changing job. She knows that at her age – "I am over 40" – and with her background, this is improbable in the current economic situation:

> As regards my salary, I cannot expect to get more …. An increase, with my skills, my knowledge, my educational background, this would not be possible … and the other thing is that after so many years you have reached a level of specialisation, which is connected to such a 'corner product' or niche, that you cannot use much of this in another company.

AF04 is also aware of the changing image of the IT profession. For the more interesting positions an academic degree is required:

> These are only a few who sit in one of the very big companies … in product development, at IBM or Microsoft or. These are the super specialists but these are anyhow 'reaching high up'.

AF03, the youngest of our informants, comes from a different generation. Having graduated in IT from a vocational technical high school she was lucky enough to find a job as a junior programmer in a young and successful IT company in a nearby town, which offers her the opportunity to learn and to grow. She describes her work as a series of challenges:

> Let's say in between there are always small things that have to be resolved immediately and you may not have a clue how to arrive at a solution, but it always works out. You also make it. And this challenge … there is always a challenge, because there are never things that occur twice … there is always something a bit different, even when someone from outside would think that I am sitting at my PC all day long typing and getting angry because this and this doesn't work. I have always got my challenge, to accomplish something.

At present, there is no need to leave where everything worked out so well and is perfectly transparent. She says

> After having finished school I did not see the need to discover the world.

AF15 was not so lucky. After graduating she made a wrong choice, starting at a teacher's college. She became pregnant very soon, interrupted her education, had a lot of time to think and decided to look for another kind of education. She contacted the local employment agency as well as a consulting agency for women and decided to apply for a 18 month IT training programme for women from the area. What attracted her was not just IT

> but also the focus on key competences such as project management, team work, communication, cooperation, and that English is a central aspect of the programme.

After graduating she looked for work, more and more "enlarging her radius" realizing that she would have to commute. At that time she also started a small project with two other women thinking about how to design IT education for women in the villages. Then the women from the training programme asked her if she would interested in an internship. After that she was offered a job as part of their team. AF15 loves her work. Her passion is training:

> This challenging, this is always something new, at least for me there is no schema, where I would say, OK, this is how I do it. Firstly, since there is always the possibility that problem and situations come up unexpectedly or which worked out fine before and don't work now, for whichever reason. Sometimes you never find out. … the women are highly motivated and committed. And you receive so much in return. And it is just fun to do something together with them and to do see their progress.

But she is aware of the limitations of her home region that do not allow her to move on.

Also AF10 made a detour before entering the IT field. It was her second job in a small hardware company that activated her interest in IT wanting to understand the hardware they sold on the one hand, to develop better software on the other hand. AF10 is very proud of her decision to go to Rome for two years after having graduated, to go abroad, to build her own life in another place. This experience was formative, also for her intellectual orientation. She was part of an interdisciplinary team and supposed to learn something that was completely different from what she had done before. This is were she started developing a 'holistic' approach to the design of information systems. While in Rome she developed a strong interest in cognitive psychology which helps her

> develop a mental model which then is transformed into an architecture with the help of graphic elements, textual descriptions, and language.

This is not just an approach to planning and designing systems but a crucial aspect of AF10's life orientation. In her work she looks at herself as the architect who tries to maintain an overview of an extremely complex, open system:

> This is my motivation, that it is something very complicated and complex. Maybe not complicated but very complex and not something small and closed but something big and open where I cannot foresee everything. …. Not only what is logical, bounded, and can be unambiguously described …

To be able to understand and control such open systems, AF10 not only needs analytical skills but a broad understanding of all the different aspects that may affect the system.

What all these women have in common is that they still are very attached to their home environment. Moving out did not imply breaking with their roots. AF04 is still very attached to her family. She mentions having gone through a difficult time recently with her mother, a close friend, and some other family members having died from cancer. Her father suffers from Parkinson. AF04 is always there to help - to pay regular visits, to inform herself about the disease and try to support decision making in the family. She says:

> We are a big family, my father comes from such a big family, we maintain very close relationships with each other. I am always informed about what my siblings are doing, where they are, we give each other support. When I need a machine or so … we swap things, even things to eat.

AF04 has inherited a house in the countryside together with her sister who is also single. This is where she plans to live when she is retired. Frequently her brothers' children stay in her apartment when they come to Vienna, such as one of her nephews who lives with her as long as he goes to university:

> When he has finished his studies, then most probably the next one will arrive. This is how it is in our family, this is quite normal.

What brings AF10 back home on weekends is her love for music. She plays several instruments, is part of her university's orchestra and still takes music lessons. Music is also the field where her social life takes place:

> Music helps me to balance out, and also (offers) a social life … already while in school I was active in our local music association, with the saxophone and clarinet … and for some time I was responsible for youth, before I went to Rome. … And on weekends I often travel to K (where she grew up) because I am still active in the music association. And this is another world, and there I show another face … I am aware of this that I have different faces …

Here she refers to her readings in psychology that helped her live these different images and roles consciously and to reflect on them.

Only AF15, who still lives near her home village, feels trapped. Her daughter is seven now. Her husband comes from the same area. He works in a print shop and can walk to work. His mother looks after their little daughter. Her family has to be flexible, since she has to commute to work and sometimes she has to tell them "I'll be an hour late". Sometimes things get a little difficult when he needs the car. She feels that she gets a lot of support

> from the whole family, also from my mother-in-law, my social environment, my husband.

She is the technician at home concerning IT where here husband is totally inexperienced. He does not want to move to Vienna but she mentions that he seems to re-orient himself professionally. This gives her hope to eventually one day being able to leave the region. They live in his parents' house which is small and everyone in the village is asking when they will start building their own house. This is something she fiercely resists:

> I don't have these roots, to say, the house is so important, this place is so important, this is the place where I want to stay. This is not it. And I refuse to build a house in the 'Waldviertel'. They put up so much pressure … these people put too much thought into my life .. Where I build my house, I stay. This I resist.

Several things stand out in these biographies:

- IT offers the opportunity to move from the margins – in our cases the countryside - to the city into jobs that offer good pay and the opportunity for learning.

- Some of the women encounter IT in their first (clerical) jobs and seize the opportunity to qualify themselves for a career, either through learning by doing (the older one of the women) or through additional training.

- The women's independence is a result of their having grown up in an environment, where they had to look after themselves and eventually also younger siblings, their affinity to technology a consequence of having been exposed to it from an early age.

Fragile or broken careers

One of the biographies differs from all others in its being full of stories of failure and lack of confidence. AF05 comes from a family with no money. Her father, a construction engineer, is currently unemployed. He has worked as a project manager in different countries, in particular in Asia, and tried in-between to use his contacts for building up a trading firm (fruits, rice, etc.) but things went bad very soon. Now, at the age of 62, he can no longer find a job and is waiting for retirement. Her mother worked as a lector for a publishing house – "she was not really a lector, she would have needed an academic degree for that" – and when AF05 was born she stayed at home. After high school AF05 wanted to study architecture, but she was discouraged, having no connections to architectural practices and hearing about the long study time. Then she thought "what else"? Her father wanted her to become a pharmacist or a physician. This did not interest her and she remembered her school experience with informatics which she liked a lot. She started computer science at the University of Technology and never finished her degree.

Her present and first full time job is with a service provider. Her job title is IT specialist. Her area is Internet applications, from database to passwords. When AF05 accepted her current job she made the mistake to agree with the position of 'document provider', fearing she would not find anything better. But in fact what she is doing goes beyond writing a server documentation -

> since as a document provider you don't have any responsibility … But when I am responsible, that the client's data are saved, that the databases work, the purchase system works, this is quite a bit of responsibility.

So the first step to take is to redefine her position and, as a consequence, get a salary increase.

AF05 apparently was not a successful student. She, for example, never did the basic but quite difficult exams in math and electrical engineering. Her start was already full of obstacles:

> That it would get this tough, this I did not expect. Programming was a horror for me. I am infinitely grateful to my colleagues that they pushed me through this. There was one course from which I really benefited a lot … SE (software engineering), there we had an excellent tutor who was named 'drill sergeant', but this was OK. He cost me an entire year, I did nothing but SE, and this was good.

When she decided not to finish her degree, she felt very bad about it. There are some ready justifications such as changes of the curriculum but:

> This was my dream, to finish my degree. But I am too much of a realist to continue nurturing an illusion.

All her computer skills AF05 acquired on the job but what scares her is to have nothing in her hands, should she lose her job. She describes herself as "maid for all things, because this includes everything, from watering flowers to taking care of clients" adding

> I define myself somehow as an unskilled worker, basically it is not more. It is knowledge acquired on the job. Who offers a position to such a person?

What remains is the notion of having failed which cannot be compensated by a good work environment. She adds:

> I am not sure if this is because I am a woman or because I don't know so much about the technology. But sometimes my colleagues make fun of me because there are things I simply don't know.

Connected to this notion of having failed is the existential fear of losing her job and not finding adequate employment. What is also nagging is her low pay – she discovered that she earns substantially less than all her colleagues:

> I try it in each career talk and each time I hear: 'This year it is not possible, our budget has been cut' … This year I stepped back voluntarily, because there is someone else who earns less, our handicapped person, what he earns this is scandalous, and that my boss wants to change this, this I understand …

AF05's idea of interesting work is to coordinate projects -

> and to be aware that there is a virus somewhere or discovering a security gap in a product, or knowing that client A wants to realize a particular project and you have to see where you find the things, what is available on the market, that you keep track of these things. This is what is exciting in this job … and also this fiddling around, when the electricity goes down, this heart attack almost, yes this is it, that there is always something going on.

AF05 finds life difficult and a heavy load. When she again talks about her failure as a student and her decision to quit, she argues:

> Finished, this makes no sense. I mean, I have to build my life, I have to be able to afford an apartment, I have to buy a car at some point, I maybe will have to found a family, have to, yes, want to. And I am 30 and still a student, this does not fit.

AF05 seems resigned and sad about her limited prospects in life. In the end she defines as her aim

> To get broader, take the view from above, now I am sitting at the bottom, I have got my 50 servers … to take just one step above and to say, I have some more client contact and define a solution together with the client.

There is, however, a positive aspect in AF05's self image. She thinks of herself as being creative. It is interesting how she describes her idea of computers before the horror of having to learn programming:

> In school they explained: 'A chip has the size of a lady bird'. And there was a slide with a chip and a lady bird and this stayed in my head.

She never understood what math is to do with informatics: When asked what attracted her, apart from the lady bird, she explains:

> You have a keyboard and can produce a circle on the screen, fantastic, this was exciting, this was stimulating, and this is nothing than zeros and ones, this is interesting, this was full of secrets … and that you have to do so much for the magic of creating a circle on the screen.

Asked for her hobbies she talks about hiking, about having done a lot of sports (which she gave up) and about:

> You will think this is funny, I do embroideries. I started this 1 1/2 years ago, embroideries. And I used to do silk painting, this I no longer do because it is so cumbersome and the colours and then the pots fall down … then I did oil painting for a while but again you have to clean this … my mother always says, I am the creative person in the family.

AF05 would like to be a florist or a gardener. With some money she would build up a florist's shop, sell flowers, make arrangements. Obviously this is not an appropriate job for the daughter of a (failed) construction engineer. She can also think of studies she would like to go into, such as art history or Arabic culture – all things that she cannot afford now

Having not yet arrived, being open

A different pattern can be found in the biographies of AF02, AF11, and AF12. These women are not unsuccessful but they have not yet arrived. AF02 comes from Germany. Her father worked for the army, her mother runs a small handicraft store. Both, her older brother and sister, have moved into technical fields. He is in the computer business and she, a technical drafter, has worked for a CAD producer. AF02 remembers:

> My parents never made any difference. I have got a brother and an older sister. We never heard, no, this is not for girls. We repaired our bikes ourselves and helped our father – my brother was not into doing things with his hands – when there was something to fix in the home my sister and I helped out, renewing the wall paper or something.

Both her parents got their own computer and her grandmother bought one at the age of 70.

At school AF02 was interested in math and physics but didn't want to go to the 'gymnasium'. Her story is that one day while she was ill in bed and her class on an outing she read in the newspaper about a vocational school with a degree as technical assistant in informatics. This sounded so interesting that she went there to collect information material and then she applied. Hers was the first year group with more women – half of the graduates. Looking back she says that it took her a long time to find out what she really wanted. After having graduated she started studying business studies at a 'Fachhochschule'. This made sense to her since she also helped her mother run her small business with the idea to take it over one day, finding out later that this would not be "fulfilling". Then her boy friend got the offer to move to his employers' outlet in Vienna and she decided to move with him. She did not finish her 'Fachhochschul' education.

AF02's employer, a software company, leases her to the IT department of a large TV station where she has been working since the beginning of 2002. She started as a "person for everything, where you run around, set up new machines and things like that". She found this support role quite interesting, since there is a "diverse landscape" at the TV station, with lots of different software. She was lucky with her group leader who encouraged them to think further and develop new skills. This is how she came to find her own area of expertise, which is 'policies'

> Where you can constrain the PC, defining which user has got which rights on which machine. This is quite complex, the area which is mine now, and includes a bit of organization, a bit of distributing work, quite nice already.

Solving problems and having ideas are essential for AF02. Once things are no longer fun, she starts thinking about something else. Yet, she perceives herself as "without a plan"

> I don't have the idea, when I am 35 I want to be somewhere …

However, the fact that she never finished her studies at the 'Fachhochschule' nags at AF02. First she did not find anything suitable in Vienna, not having the entrance qualifications for a university. Now she thinks that she found something and she has made inquiries about a new 4-year programme 'Project management in IT', again at a 'Fachhochschule':

> They offer this as an evening school. This is quite tough time-wise. And this is why I listen into myself …. the evenings, three evenings per week and the Saturdays, this will cost some of my substance. Some of the things I can skip since I am from IT, nevertheless …

She already thought about some of the requirements such as a 6-month project in a company – this she would be able to skip – and the possibility of linking her theses with her current work.

Getting a degree for AF02 is not to do with

> Having a career, this is not the motivation, I just started inquiring and I am still thinking. This year it was not possible since I would not have been able to do the installation of a new system in the local TV station, and this is what is much to my heart …
>
> *You just said 'to do something for myself' ...*
>
> Yes, learning something new, this I find so positive … (*and she adds*) also were I work now I have the free space to look at new things … And with this I am very happy now.

AF11's father was a mechanical engineer in a big Austrian steel company, her mother worked as a teacher for needlework and handicrafts in an elementary school. Her two brothers, both much older then she, also work in the technology sector, one is a software developer, the other one a computer scientist. AF11 always had an interest in natural sciences, in particular biology and genetics, but she also liked languages. She finally decided to study technical mathematics:

> It was a big problem for me. I didn't really know what kind of job I could do afterwards. Something really technical, I don't know, you have to put much effort in that, and there are no enterprises paying for pure research in mathematics. …and it was sometimes very hard, a difficult study. … one possibility always was to stay at the university.

For a short time she had a job in an enterprise, where she had to give software courses for people working in hospitals, but that was not hers, so she left very soon. Her second job was in upper Austria at a "Fachhochschule" as a research assistant in a project developing a virtual character that talks in gestures. The challenge was to support different views so as to be able "look over the shoulders" of the creature. This was an eye-opener for AF11. She loved the work which also gave her the opportunity to do presentations and to be in contact with the mass media. Her current job in a small multimedia company helps broaden her interests in multimedia production:

> Here at the I we develop really interactive installations for museums and exhibitions, that is a broader range of contents. We have also worked with virtual characters. … I am a bit involved in development, but more in communication and organisation, writing documents for the EU doing a bit of organising.

She started getting involved in the company's PR activities and is changing her role in the direction of marketing and selling.

> I have to admit, I've not done this C++ programming for a long time yet. I'm more the one being in contact with people.

AF11 describes herself as open minded and extroverted. She loves getting in contact with people and appreciates the possibility to talk to politicians and bosses of big companies.

Although enthusiastic of her job and the company she works for, AF11 does not yet know where she wants to be. One of her life themes is "to be late in realising what I really want". When she is telling stories of her life, she very often ends up with "…and this came to my mind rather late" or "…as I said before, all the things I realised later". This includes her interest in technology:

> I always realise everything later, after my studies I have realised that I'm interested in technology, but if I think about it, I have always been fascinated by electronics and so on, e.g. the Ars Electronica in Linz.

After the interview she says off-record:

> Additionally I have to say, that I don't really want to have children now, probably that comes, when it is too late. … I think it is really sad, when you miss so much time in realising what you want to do in your life.

Both women love their jobs, are committed and hard-working but are still open where to go. This is partly to do with their age, partly with the fact that they are still in a transitory stage, with AF02 still pondering to finish her education and AF11 experimenting with different career perspectives.

The biography of AF12 is one of challenges she takes up successfully but there are always backlashes that discourage her. Originally she was sure that she wanted to become a kindergarten teacher. But when her brother made the entrance exam for a technical vocational high school (HTL) and told her that she would never be able to pass it, she wanted to prove him wrong. She had always been good at mathematics. So she did both entrance exams and passed both. Why she then decided for technology she says was more a choice "by the head". She said to herself that she could always look after children but that it was something special to be one of 36 out of 200 that were admitted – "and then it was somehow attractive." They were four girls in their first year and one of the teachers said in his first lesson "Yes, you are women, you have to be better than men."

> That's what he actually said, those were his exact words. … And this is what I have kept in my memory, because I found it so unfair.

AF12 says that those were hard times. She went through several crises but finished the HTL and applied for a job opening for "international application engineers or system specialists, who are prepared to travel" at a big furniture house. What attracted her, again, was "this idea to go to such an interview and just test it". She managed to get through three rounds and finally got the job. She had her final exam in June and two weeks later she started to work. She did not go on the school finishing journey with her classmates "because I was so fascinated. Because I thought, when I am so fascinated, then this makes sense, then I do it". During her trial period she applied for two drama schools but was not accepted.

At the furnishing house she worked on the sales system. Until the end of the year she did the programming herself and from the next year on she did it all alone "the whole system, that was before done by three persons". She started to feel bored and so she decided to study at the University of Economics and Business Administration and moved to Vienna. At the same time she changed job moving to a database company where she worked as a senior consultant and instructor and spent four months in Italy for a training course in financial applications.

AF12 then started to work as executive manager of the section on corporate applications in an electronics company producing microchips. She had hesitated to take this position that was offered to her by a former colleague who had taken over the company's IT department. But as soon as she realized that she would head a department and knew how she would do it "with which kind of vision", she could accept it. She encountered a lot of problems, was mobbed at some point, and in the end had to leave. AF12 has now found a training program in "intercultural IT management" which she perceives as a great opportunity for learning:

> I have to do with other people who are in the managing board, where I suddenly realise that this is my level. I meet managing directors who know much less than I do and are managing directors, so where I suddenly feel where I belong.

She is still unsure what she will be doing after the two years. On the one hand she has the vision of managing "really internationally something very, very big", on the other hand she talks about getting self-employed and offer training courses to women.

> It is quite interesting how AF12 talks about her decisions. These are stories about something she originally did not want to do but nevertheless did, when she saw that she was among the best. In the foreground is the notion of "testing herself" rather than being interested in technology.

AF12 has always worked very hard. She describes herself as of a "perfectionist disposition". At the same time she lacks self-confidence and is in need of encouragement and support. She for example mentions that she has always felt her potential not only in technology but also to lead people but she did not have anybody to help her develop her capabilities and to support her. When she experienced mobbing, she felt weak and started questioning herself:

> And there were many such things, that cost me a lot of energy. And then I somehow started also with different seminars on personality training, with therapy, with communication to look at the image that I have about myself: Who am I? What do I need? Why is it running that way? Why could something like that happen anyway? And to develop new mechanisms, to live my potential and above all to better distance myself.

AF12 talks about challenging projects that virtually made her feel 'high' when she managed to solve difficult problems.

> And these are those points, where I have real ingenuity, even when it is really critical to stay relaxed and simply to stick at it. And then I had such "high-altitude flights". So time and again I had very strong experiences of success.

She is under constant pressure to learn more and to prove herself. She has earned certificates in several languages, amongst other things. She invests an enormous amount of energy in improving herself and her skills so as to avoid failure but never feels secure.

At the back of her head is still her love of the theatre. If they had accepted her at drama school, she would have become an actress and would not have continued to work in technology.

> Because I said: What am I doing there? My heart is not there. I want to live. So I think, it has always been the question how to combine the vision of my life with technology. This has been missing from the start, this: What do I want in my life and how can it (technology) help me? And how can I reconcile it or how will this go on?

Cross-cutting themes

There are experiences that cut across individual biographies, allowing a more general view of women's situation in IT, namely of the diversity of backgrounds and career paths, of jobs and working conditions in the field, and the role of gender.

Diverse backgrounds

One of the most interesting findings concerns the role of growing up on a farm in the Austrian countryside. It means growing up in a large family with parents who are working and don't have much time for their children, and apparently more independently, with fewer restrictions and role clichés. Four of our informants have left their home region for the city and found career opportunities in IT. However, their family bonds are strong and alive, and they tend to go back home for weekends or when the family needs them. Only one is still close to her home with the desire to leave.

Fathers are generally described as supporting. They have been influential through their own closeness to technology rather than actively shaping their daughter's career path. Some introduced their daughters to computers, others had interesting passions such as being an architect/designer. While fathers have a supportive but rather passive role, some of the mothers seem to have been powerful role models. They appear as strong and admirable, as supportive but also demanding. AF06 talks about her mother as a role model:

> Somehow my mother was quite a terrific, somehow also very emancipated and actually feminist woman and therefore a role model.

AF07 describes her mother as a generous and caring person, who protected her whenever she was in trouble, for example at school – "she was the protecting wall". When at the age of 15 AF07 started thinking about moving away and being on her own, her mother always let her know that this was right, saying: "Go your own way, do what you want, get yourself a job". She is proud of her mother who for example

> Learned how to use email, to surf in the Internet when she was over 60, and how she can play games and use Word, Excel … I think that what I learned from my mum is to be interested.

The person who influenced AF13 most was her mother, a high school teacher, whom AF13 describes as "a strong woman and oriented towards feminism". She was a student at her mother's school and this

> was good and bad, I think, I never had a chance to skip lessons, she always heard when something went wrong, naturally, and not much happened since I was a good student and quite well behaved … and for one year she was my Latin teacher. This was, hm, how should I explain – this was super because she is fantastic teacher, she was certainly the best Latin teacher I had, and this was the one time within six years of Latin that I found it interesting.

AF13 characterizes her mother as strict

> She was quite liberal but also strict, yes. Things she did not like she did not accept … she had her principles which she expected me to follow. At least me, with my brothers she was less successful.

When asked if her mother is proud of her, AF13 asks

> Of me? – (*Yes*) – Yes I think so, I am not … I don't know, difficult to say, but I think yes.

Her mother plays an ambivalent role in AF03's story. On the one hand she wanted her to learn cooking, on the other hand AF03 describes her as open and supportive. For sure the mother was the one who had to face the neighbours' comments:

> This is what my mother had to face: 'What shall she do afterwards? What will become of her?' But I didn't mind because I was not aware and I don't mind now. And now its more 'big eyes' since no one had imagined that I finish this.

This is what also the mother did not believe in the beginning:

> She always had this fear that I would not make it, it was quite tough … the whole (first) year, because she asked almost every week: 'Will you make it? And if not, what will you do then?' Because I had so much leeway to make up after secondary school. And I made it, probably this was an incentive that she asked me all the time since I felt I have to prove it, I will make it …

Now the mother is proud of her daughter, who has got a high school diploma, and as AF03 formulates it:

> Now she is glad, there is someone who can fix her TV or her video recorder and everything works and she doesn't need a man for this, she can just ask me.

AF03 mentions that she never was aware of any difference in the ways women and men are treated, and again referring to her mother:

> This is the way I grew up, my mother was quite open … of course she wanted that I learn to cook … but she did not really, she has got a rather modern mind. Maybe it is due to this that I am a programmer now.

In one case it was the older, much admired brother who is described as an important influence in her life. When he got a new computer, he gave is old one to her, says AF02:

> He for sure shaped my interest for computers, I would say that. That we did these things together, this was my big brother, seven years older, this was someone you admired. And he always gave me his time for this.

Her brother still blames her parents that they did not urge her to get a degree.

Diverse career paths

The women's career paths follow different patterns. We can roughly distinguish between those, who

- entered a career in IT, moving straight ahead or even succeeded in creating their own field of work within IT

- ended up in IT after some detours, some of them discovering their interest in the field, others, while a few others are unsure about their choice and are looking for something else.

The biographies of AF07, AF08 and AF09 are examples of straight careers in IT, two of them academic. AF07 entered informatics somewhat accidentally:

> It is really by chance that I chose what I then enjoyed tremendously, I really liked my study programme.

Her ambition was to work on a master thesis with a practical outcome – a product. It happened that one of her acquaintance's offered her a job as a part-time project assistant at a

university, where she had to develop special software. She put a lot of energy into this project which was part of her supervisor's long term research programme. After more than two years of intense cooperation both decided to set up their own software company together.

AF09 stepped right into a typical academic career and became a full professor at a quite young age. Looking back she says:

> I never really consciously planned my career, that's what I have to say actually, but it all came about step by step, nearly by itself.

It was more complicated for AF08, who also played with the idea of becoming an architect but decided to finish her computer science degree when she got pregnant. Having applied several times for a chair with no success, she decided to found her own spin-off company.

While AF07's main one of the main life theme is shaping her own environment, AF08 tries to find synergies in her life, to connect her two extremely demanding work places:

> Topics come from industrial requirements – pure research topics, and they come back again to industry. The point is, that you know, what your research is for.

Her understanding of synergy is also connected with her talent to do many things in parallel, although at the cost of health problems and not being able to spend enough time with her children.

Three of the women found their way into IT through a clerical job. AF04 is the oldest of them. She started her career in a small to middle-sized trading and production company where she stayed for seven years. Although she had no background in IT, she managed the transition from manual to IT supported work in the office. Her present job in a bank she found 17 years ago through an advertisement. She wanted to move on, develop herself, and become "more professional". Another important aspect of her current position is the respectability of working in a bank. This is a stable environment that offers a variety of fringe benefits for its employees – they reach from six weeks of paid vacation and daily lunch in the cafeteria to a place in a nearby kindergarten and a parking lot. The fact of working in the city centre adds to the attractiveness of her present work. She adds:

> And everybody knows XX, this adds to your own reputation and signals prestige … this is how I look at the company.

Currently a large project ended after seven years and there are major rearrangements of staff. The bank makes the transition from host technologies to a server-client technology. They have hired a lot of external programmers from companies who lease people – "there are lots of such people on the labour market, many of whom have been retrained".

A major problem in AF04's current job situation is that she belongs to the 'old group' who was responsible for the host-based system:

> I am part of a group who has a position at the periphery. And I don't like this, I don't like this at all … the group that worked on the old system, which has been stopped. And the other group works on the new system … we currently have this game of two types of employees in IT … Everything can be different in a month, since everything is changing …. My old area of work … no longer exists and I have to build a completely new area of expertise, and this will take a year… and I may be re-trained and get new tasks and topics, I don't know how this will develop, and new hierarchies, new colleagues or groups. … This is the first time in my life that I experience something like this. It is as if I started in a new company.

AF04 has achieved what was possible for a woman from the countryside with no high school diploma. If she had had the opportunity to go to university, she would have chosen the

sciences and an academic career. She would also be interested in product development within a technical company. Her future at the bank is not entirely secure and of course she has thought about changing job. She knows that at her age – " I am over 40" – and with her background, this is improbable in the current economic situation:

> As regards my salary, I cannot expect to get more …. An increase, with my skills, my knowledge, my educational background, this would not be possible … and the other thing is that after so many years you have reached a level of specialisation, which is connected to such a 'corner product' or niche, that you cannot use much of this in another company.

AF04 is also aware of the changing image of the IT profession. For the more interesting positions an academic degree is required:

> These are only a few who sit in one of the very big companies … in product development, at IBM or Microsoft or. These are the super specialists but these are anyhow 'reaching high up'.

Another handicap for AF04 is that she is not good at selling herself and how should someone know what you have to offer as an IT specialist, if you cannot make it visible through how you present yourself. She concludes:

> I have this attitude with respect to work, each person brings a number of talents with her, and with the willingness to learn and the interest, you can acquire a lot. I think if there was the possibility to change into something completely different and this would be something that is attractive, yes I would make the transition, 'with determination', this I would do.

These experiences seem typical of an older woman in IT who has no formal education but good practical skills that are gradually made obsolete as a result of newer and 'younger' technologies.

Several of the younger women have entered IT through other jobs, such as AF13 (tourism and marketing), AF10 (clerical work in a steel company, then a small computer company), and AF16 (studying journalism). AF13 discovered soon that tourism was not really her area. There were hardly any jobs around and non offered an entrance into back office positions. She looked around and the only thing that caught her interest was a position as marketing assistant in small vendor company. Marketing was anyhow something she liked and felt competent in. A little more difficult at the beginning was her support task since she did not know the products but she managed. She gradually moved into training and organizing seminars. After two and a half years she felt that she knew everything and she no longer felt sufficiently challenged. This was a dead end job with no opportunities for further learning, advancement or a higher salary. Meantime she had looked around and found a 2 year college training programme in 'commercial informatics' at a school in Vienna who accidentally also was one of their clients. Her first and current job is in a computer company that hired her as a IT consultant. She actually works as a project manager with a focus on quality assurance. Although the company is in economic troubles – it was downsized from 70 to 30 people within a short time – and there is not enough work, AF13 talks enthusiastically about her projects and achievements. Still, she feels that she is not a competent developer and this may be a handicap for her career:

> I learned this in one of my projects, how important this for asserting yourself, for creating the feeling I know why I say this. This is important also for yourself, it makes you confident that they cannot tell you anything.

Recently, AF13 was faced with a difficult decision when she was offered a better paying job as a senior consultant in Germany. This made her ask herself:

> I mean so many of my colleagues are friends now … Is it more important for me do to the next career step now, I mean this can happen later, I am 27, this can happen later, I am anyhow among the youngest. Or do I want to stay because I feel fine and I like it where I am?

At that point her company offered to pay her a special training course offering a certificate as project manager

> Then I felt, currently things are not so good and my capacity is not fully utilized but they want to invest in me, help me take a step forward, otherwise they would not pay for this.

After graduating from high school AF10 first had a clerical job in a steel company and then in a computer company before studying informatics. These were extremely productive years, she says, because she was already quite focussed, knowing what she wanted to do. Her experience in Rome as a research assistant in an interdisciplinary project helped her widen her horizon. This is how she found her special academic field in which she entered a successful career path. Her vision for the future is firstly, to build a competence centre in e-government at her university and top eventually apply for a chair.

AF06 found her way into computing from studying journalism and learning about the Internet. Her web design skills are completely self-taught. After an intense period of work, first in an e-government project, then building up computer training for women, she just finished her master thesis in journalism. Concerning her future plans she says that she does not know if she still wants to be self-employed. She is sure that something will turn up. But she does not have any concrete plans. She thinks about several possibilities: One is to work in the organisation and management of seminars, for example training trainers or building up a pool of trainers. But she can also imagine to be engaged in equality management, organising the promotion of women in companies.

Computer training seems to be an attractive field for women in IT. AF15's task is system and network administration but her passion is training. Also AF12 who had an impressive career in IT and just lost her job a result of an internal conflict computer training is an interesting alternative. She has some experience as part of her work for a women's network and can imagine to do this for a career.

While all these are examples of successful careers, we can also identify obstacles in the women's biographies. One example is AF01, one of the older informants, who after having studied technical mathematics and working for 1 1/2 years as a research assistant at Tokyo University, started an at that time formidable career in a steel factory. Her first job was in Korea, where she stayed for 1 1/2 years in process automation. Upon her return she continued as a project manager. This was no longer a programming and implementing but a planning job. For almost twelve years she negotiated complex contracts, where "the contract has an essential role in the success or failure of a project". She then decided to apply for a job opening as head of sales in a subsidiary responsible for the company's business in North and Latin America. She had learned Spanish and again wanted to go abroad. For a variety of economic and political reasons this market did not develop and AF01 had to return to Austria to her former position as project manager, this time for internal D&R projects. Since then she is in charge of the company's training programme, coordinating specialists training. For this she has developed a 'trainings simulator' and an 'expert pool', a database. AF01 describes this as an interesting and challenging activity, her responsibility being to teach future steel operators. This implies operational knowledge about steel production as well as about the different automation tools, from the programming language to the database and the application software.

> The prospect to continue writing computer programs for the next 20 or 25 years, debugging, implementing and again writing, writing routines and debugging and programming, I didn't like this prospect, although I am interested in this kind of technical environment. This was not my vision.

Looking back, she judges her decision to leave the technical field and apply for a sales position in a small subsidiary company as a move "from specialist to generalist". This certainly reduced her possibilities to sell herself, in case she decided to leave the company. Although her career move – "no one pushed me out of this area, each time this was my own free decision" - ended a step back in the hierarchy, her responsibilities now are varied and challenging. "This was the most decisive cut in my career", states AF01, more important than the 16 months of maternal leave she took when her son was born. At that point she already had a position in project acquisition. When she returned she first worked on a 25 hours basis to then gradually go back to full employment (38 hours).

Asked if she ever was promoted or had to fight for her position, she answers:

> To fight, no. I wouldn't know how to fight … how to fight and survive and make a good move, this I would not know. This rests upon consent … that someone tells me: 'You have done an excellent job, wouldn't you like to do this next, this would be interesting for you, help you move up'. This never happened to me during my job history - I don't call it a career.

What may hold women back is the lack of a degree (AF02, AF04, AF05), the lack of job opportunities in the area (AF15), or the lack of hard-core developer skills (AF13).

Working conditions

Most of the women are satisfied with the working conditions within IT. An exception is AF05 who, out of fear of not finding a job, accepted a bad contract. However, she loves the place where she works. People come from many different areas, from chemistry, business informatics, mechanical engineering, business studies:

> A colourful bag. Maybe this is the reason for this nice ambience, that you are not so, I say it directly, narrow-minded, like I only know my computer science and this is my horizon.

Cooperation is dense and informal and they have a lot of fun:

> Very informal, work is passed on by just saying: 'I don't have anything to do right now, do you have anything urgent?' Or when there is real brutal pressure, there is no one who would sit around idle. We also go out together in the evening … I think what we have in common is that we try to 'maintain the child in us'. We love joking, even when working very seriously …

AF05 tells the story of her manager, a woman aged 40, who used to be in such a bad mood in the mornings, shouting at everybody. Once she remarked quite casually: "You are not the morning type, eh?" and since then things improved:

> When you accept some of her peculiarities, yes, but you can talk to her. What I like very much is that amongst ourselves we are very open and direct. When someone is in a bad mood, you can talk about what is the reason. This does not just get swallowed up or swept under the carpet.

AF05 is happy to have this job, apart from the bad contract which needs to be changed:

> Such good luck, things being so 'rounded off'. I think this is more an exception than normality. I know this from other companies, where you have … such an un-agreeable way of communicating, so much competitiveness …

Being member of a good team seems to be an important asset in the women's working life. This is also the case for AF03, the youngest of our informants. For AF03 her present job is ideal. She feels accepted, has a strong interest in her work, is curious to learn more, and is very happy in her work environment. Her desk is in a large office space. This she likes, although there is one desk no one likes since passers-by can have a view of your screen. Although the company has grown, she knows the people around her very well. Some of them she even knows from her school time. This creates a family feeling. Her colleagues are cooperative – when new and difficult questions arise she knows whom to ask. They often go out together in their free time. The last company outing to Dublin was a great experience – "I cannot think of another company that would fly for four days to Dublin". AF03 does not have the feeling to work in a hierarchical structure:

> S who talks to the client, he sits just next to me. When I need something, I just ask. There is no hierarchy, rather a 'doing things together'.

AF15 is proud of being part of a competent and highly committed team. For AF02 her team is a central aspect of her work life. She works closely together with another colleague with whom she thinks about new things to do and this always results in creative ideas. She feels accepted and appreciated by her mostly male colleagues and often assumes the role of conflict mediator. She sees this as a positive aspect of her being a woman:

> I believe that most of them value having a female colleague, and I have the feeling that for how we communicate this may indeed be helpful. When it comes to problems to solve or conflicts between colleagues, I have this mediating role, since I get along with all of them.

In particular in young companies colleagues tend to become friends.

Team work is a feature of much of IT work, since most software development tasks require dense cooperation and coordination with others. Help from others may be needed for example with complex bugs - this is not something one can do alone. Then you ask someone who is an expert in things that you don't know so well. AF04 adds

> And this is their responsibility, this is not something they do on a voluntary basis, but it has been defined that they provide information and support, their special expertise.

AF04 also expresses a view of working times within IT which we found with most of our informants. Time pressure is a normal aspect of an IT job, AF04 says. There are deadlines you cannot influence, such as information having to go out on a certain date, or a legal change which needs to be implemented within a certain period of time. And there are self-imposed deadlines.

> When there are deadlines, then time is always running out … and when the deadline approaches, there is pressure, there is stress, even when everything is ready: Is this correct? Is it not correct? Does it fit? Is it OK for others? This is always there. Does it work? Are there any bugs? Are there complaints?

That the women so easily comply with the rhythm of IT work may be to do with the flexible working hours that are common in the industry. Only the two women in charge of their own company mention exceedingly long working hours. Both have partners who take care of their children. For AF07 life changed radically when her son was born. She thought herself too young for being a mother but then "this three years old monster" started occupying a large share of her energy. He moved into the very centre of her life and she feels "totally happy" with him. Her idea is to offer her son as happy a childhood as she had. AF07 is used to hard work and high work loads but

> What makes it more difficult is that I have a young child and this is another kind of stress than the stress connected to work. I can easier cope with work-related stress than with this other type of stress.

AF08 who has an 80 hours week is aware how much she exploits herself. Apart from not being able to be with her children, she mentions the lack of time for herself.

> All your brightness makes no sense, if you know very well, you should rather go for a walk sometimes and take you time for yourself – sort of freedom. When I got my second baby I read the book of Virginia Wolfe with the title 'A room on one's own' – well, I read it.

Still, working extremely hard is a taken-for-granted aspect of working within IT. In particular for the academic women. AF09 says that she likes to work. She works a lot so that it is often difficult to make private appointments like going to the theatre. Especially now that she has had to build up the institute she had to work hard and "it was very, very intense – concerning the amount of time it took." She defines work as "a challenge and also nearly a little like a drug".

Technology

What women get from working in IT, apart from good salaries, is the possibility to learn and to be creative. This is a strong motif in almost all biographies.

AF01 is a highly professional woman and she is ambitious. Writing computer programmes for the rest of her professional life was not her vision. This is why she tried to move somewhere else, into more responsible and challenging fields of work. Already during her student time, she broadened her horizon by learning foreign languages and her move to a Japanese university was exceptional at that time.

She describes some of her most precious moments while working in process automation:

> The 'starry moments' are when you sit in a team … developing a solution … and then you return to your desk and work on your contribution to this solution … to return into the team and join it together … This for me were the 'starry moments', the most rewarding activities, the greatest intellectual challenges, to develop something new … Unfortunately you cannot patent an algorithm … You must not allow the space to get too small, the time period too short, in these process diagrams … you have to study this thoroughly, since otherwise half of the production comes to a halt, because you have made an error. To develop these kinds of things is wonderful.

All the programmes she wrote worked fine. The technicalities of steel production fascinated her and she always took an interest in understanding the perspective of steel workers. But she needed something more. One of her achievements in her present position was the development of a 'training simulator':

> There was no trainings simulator for these requirements, nowhere in the whole world. This has been developed by a team here and it works, it works well. This is a challenge.

A strong theme in AF03's life is meeting challenges. Her mother's anxious question – 'Will you make it, and if not, what will you do then?' – motivated her to work hard and success at school gave her the self-confidence to do what in her environment was considered unusual. She feels lucky to have started her work life in a large project

> Because this is real fun, since you see the progress and that you can model a whole company in one programme. This was completely new to me …

She describes her work as a series of challenges:

> Let's say in between there are always small things that have to be resolved immediately and you may not have a clue how to arrive at a solution, but it always works out. You also make it. And this challenge … there is always a challenge, because there are never things that occur twice … there is always something a bit different, even when someone from outside would think that I am sitting at my PC all day long typing and getting angry because this and this doesn't work. I have always got my challenge, to accomplish something.

This ability to see something new in the many details of everyday work is the basis of AF03's strong internal motivation:

> To have work where I arrive in the morning knowing exactly how I will leave in the evening, because every day is the same. This would be horrible for me. I cannot imagine this. Now I have new tasks every day and every day I have to think about how to cope with them.

It is interesting how she identifies with her work, using the 'I' to describe a state of remaining the same versus changing through having to master new tasks every day. She tells that she is used to talk to her computer, getting angry when something doesn't work. Her colleagues found this strange in the beginning but now they are used to it.

Having been an excellent student from her early school days on, liking math, and adoring the work of developing software have shaped AF07's relationship to technology. Interestingly she sees herself as

> A person who prefers the second row, who loves to implement things more than the strategic development of new things.

Her competence is solving problems – to structure a problem, find a solution, and organize its implementation:

> This is my passion - to be given a problem and to solve it … This is why I always was a good student.

This is reflected in the software the company produces which supports the solution of highly complex problems:

> This is what I love, I need the hurdles, I always needed them, I need challenges and I need the next mountain to climb up.

During her studies AF09 heard a talk by a colleague who brought up the problem of a graph of 15 nodes each with four links. He posed the question if there is an optimal solutions so that each could communicate with any other.

> And this problem was fascinating for me. I am a passionate solver of riddles. And this seemed to me like one of the riddles in the magazines.

So she was proud that in her master thesis she was able to show that there definitely was an optimal solution for this problem. "But of course this was a great impetus." What is fascinating about her work is when the models she builds up reflect reality. She loves the analytical and systematic thinking that she has to apply in her job.

> Those validations, when you see, that you have finally understood the process, that you can depict it in a model that is consistent. This gives satisfaction. … This understanding of the world in miniature is simply fun, yes.

So what she likes about her work is "solving riddles and generally the curiosity to get to the bottom of things".

Also AF12, who is still pondering a career as an actress, loves working with technology. She describes the IT branch as one where there is a lot of money and there is the possibility to do new projects and to get in touch with people.

> I am fascinated by things that are developed, that are being put into practice, and I have always been on the pulse of the time in technology. I have always been amongst the first to test new alpha versions, and I feel this somehow makes me happy.

At some point she mentions her idea of a "technology cabaret".

> So I like to tell these stories of my life, also the one, how it went for me with management and technology. I like to tell stories because this is something where you can see someone and take it as an example. … and through this appearance (on stage) to show that there are women, there is technology, there is something to achieve and it is quite simple, you only have to be able to imagine.

Gender

Gender is a topic for many of the women, for diverse reasons and from different perspectives. AF01's descriptions are full of implicit hints at men who are different, who don't share what she deems valuable. She sees men as fiddling around with details, as looking down upon users in a disdainful way, and she gets angry when talking about men using female terms when characterizing computers.

This anger is mixed with allusions at being at a disadvantage with men. It comes to the fore when she compares her situation in Austria with her positive experiences with communicating with other cultures:

> In Austria this is sometimes more difficult … colleagues who know me also know that I deliver what is needed … that I satisfy the requirements … The less people know me the more reservations I meet: 'Should she do this?'

She continues talking about situations when you do 95% of the work and someone else is the project manager:

> Such tendencies you ought to destroy or prevent from the beginning. There is no one saying: 'You should not do this, you cannot do this because you are a woman.' No one would say this, no one would express this directly but it is like this that he is the project manager and you do the work. And then you need to talk and bring it onto the table.

While technology is not something special for AF04, she is aware of gender differences, also in her company, for example unequal pay. She does not feel discriminated but makes her observations. Currently six of the 40 IT staff are women. But this was entirely different when she started. Then the company was dominated by women – "the only one in Austria", with the head of department being a woman and at least 50% of the staff. Her explanation is that the IT department developed out of a unit with skilled clerical workers, most of them women, who had the knowledge, and when this unit was turned into a company of its own, they were the ones who built the firm's IT expertise:

> And then, when there were stable structures and the firm had grown, with each change of management there was a change of hierarchy and then mainly men were hired. This is quite simple, after 30 years they had exchanged everyone.

AF04 talks about prejudices, preventing women to get into a technical field, where logical thinking is required and you have to work so hard. She concludes with an anecdote about her

sister-in-law who didn't want to send her son to an IT school because you have to learn so much and work so hard, arguing:

> The poor boy, this would be too demanding, this is so difficult, he has to learn so much …. I then replied: 'You know what I do for work?' No, she didn't.

There are few stories about outright discrimination. AF14 found it hard to enter sales in EDP.

> I am in sales. And that is, when you look in the companies, there are 95, 99 percent men. That's a fact. And they obviously protect their realm very well. Yes, and as a woman you don't have that technical touch.

She talks about stories being told such as that „ a woman only has to wear a skirt and then she sells anyway". She thinks that this is something men only dare to say in an Austrian company (not in an international company).

> So you have to show a certain toughness and say: OK, this does not bother me, when I am confronted daily with certain prejudices simply. … But when you work in such an environment – like in EDP, where you know that it is dominated by men – you have to be prepared, that it will be like this, and somehow develop mechanisms to learn to deal with it.

She describes her experiences of being tested by customers for her technical competences "where I felt like I am doing a talk of application and not that I am now somehow talking to a customer about his projects".

Although 30% of the staff in AF13's company are women, there is no single woman in middle management. She talks about her female colleague and herself as being disadvantaged. This is to do with the fact that they are not allowed to participate in first negotiations with a client. She thinks this is because she looks so young and maybe would not succeed in getting a contract:

> This what our two senior service managers do. And unfortunately this maybe a good thing. But its is a disadvantage for me and my colleague, since we then often don't get the project or are second choice, and this with the argument that we don't have as much experience as our two (male) colleagues, which is the case. They are both older. … I think they have a stronger … with the client, maybe this is not so case, one would have to try it our, they sell it this way to us. And we don't get project with a volume bigger than 50.000 or 75.000, this is the size we get and nothing bigger. This is what we have been told. …. And the argument is that there are two project managers with more experience … and more successful projects. This argument does not hold at all. They managed larger projects but not all of them successfully … and I don't know if you can see it this way, all of my projects were successful. They are smaller but successful.

She talks about patriarchal structures and about decisions being taken by men. Already at college women were a minority. AF13 tried to get to know more women from IT and got involved in 'Web-Women' and another association where she organized a panel on 'Women in IT'. She is regional coordinator of 'Web-Women' and sits on its board.

This engagement for women in IT is shared by several women. AF06 just finished her master thesis on women in leading positions in the IT industry. AF07 became engaged in the women's movement as a young student and "a conscious woman" – and in the peace movement. There she always met other women, somewhat older than her, who gave her support, encouraging her to go her own way. This made her gain her self-confidence which she tried to transfer to other, younger women and girls, mainly as part of her work in the youth centre. AF07 has some experience with working in all male environments but where she is now discrimination is not an issue. In the beginning there were more women than men

in her own company and after some major reorganisations the proportion is still 50:50, because she loves working with women. AF07 knows that her work situation is exceptional:

> I am sometimes amazed that things can indeed be different.

AF12 works for an association that is supporting women in technology. She feels quite ambivalent about her own story. On the one hand she describes her development as one where she had for many years lived her male side.

> Because for me it used to be - I had this image of women: Women are sexy and beautiful and erotic and attractive, but they are stupid in their heads. So this was the image, and this is what I wanted in no way. And this was the reason, why I think I was very hard, very male and took drastic measures. … So I am now developing my female side, where I just as well risk to show emotions, to be soft, to be weak or to admit, when I don't know how to go on, what I would never have done before.

Coming from the countryside has opened AF15's eyes for gender issues. She grew up in a household of women (the father being often absent) and she always liked being and working with women. At the training centre she started looking around and thinking. She immediately was interested in her colleagues

> To see other women who are interested in this kind of training, during break time find out where they come from, what they did before. Just to have this mix of women, some of them with exciting life stories.

AF15 identifies strongly with the women at the training centre. She mentions their environment which is often so discouraging, creating insecurity:

> It is so important for these women to find a job after having finished their training. This means the more they take up from this, the more insecure they feel … we see how quickly they absorb these anxieties, also before going on internship, how nervous they are, how much anxieties there are.

Some of the women enjoy working in male environments and they are proud of being successful women, such as for example AF09, for whom being a young and successful woman in academia

> is a topic and sometimes it is simply fun to cause a sensation in this male world.

Without being asked, AF14 talks about enjoying the atmosphere in a male (technical) environment:

> I enjoy being in the technical sector. That makes real fun. Maybe that's the reason why I plan to in direction of selling, because in our sector the clients are mostly men, and I realise they are quite fond of talking to a women. I really enjoy that.

Working in an almost all male environment appears pretty normal to AF03 – this is what she is used to from her childhood when as a single child she was surrounded by boys. While in school she never was aware of any gender difference in the ways boys and girls were treated. In her unit she is the only woman and there are 3 more women in other units. Still, she makes an interesting observation about different programming styles, comparing herself with her colleague E with whom she cooperates a lot:

> We realized that we have a totally different way of thinking … with E it is, he wants everything function in a more beautiful and fast way, and he'd prefer to rewrite things five times, always the best way and even better. Whereas I think this must work and should be useable from another perspective, I would like to have code for several things that I can reuse,

> and he the optimal code … and as we get along so well, this works perfect, since we have this division, we produce good code and are partly able to reuse it.

There is a small story she tells about a two-day training course in (self) presentation. When she arrived, she discovered that she was the only young woman (just graduated from school) among 'elderly men' (no one below 30), many of them managers:

> This was quite interesting in the beginning, how the men reacted. But the lecturer found it great. As I did not care since I am always with men, because I am used to it, it became immediately normal. If you don't set yourself apart, no one cares.

"I also wanted to be involved" and "they didn't expect someone like me", she concludes.

Male biographies – are they different?

We found two main patterns in the few (five) male biographies - '*building one's own environment'* and '*IT as a hobby*'. The sample of men we interviewed is far too small for a systematic comparison. There are, however, some interesting indications of gender difference.

Building one's own environment

When AM01 started his first university job, he helped his professor build competence in computer graphics. He embarked on a straight and very successful university career. Already with a tenured position in his pocket, he was invited as guest professor to another university where they did mostly applied research – "incredibly exciting projects". This experience supported his decision to leave academia to build up a small spin-off company specializing in Virtual reality services and interactive installations, developing innovative visualizations of e.g. complex machines or architectures, virtual characters and all kinds of installations for museums and exhibitions.

AM01 is head of the company and responsible for organization, project acquisition and everything that is to do with Human Resources. He describes himself as

> Running around all day long, looking how people are doing, talking, interfering, they start shouting …. And I believe that people in the company are content, even though when a project turns out to be a flop, this critically affects people's feelings … So our strategy is to always finalize a project in the best way we can, not saying OK this are the constraints and they get crap, main thing we are financially positive, our strategy is to say we do something good so that the client is satisfied, because then he'll come again next time.

AM01 takes care of his staff. He for example conducts a career interview with each staff member every 6 months, where they reflect together and look into the future, thinking about steps to take. This year he introduced a cheque (budget) for further education activities. Either people come with their own suggestions or he proposes something that seems promising. His vision for the far future, before retirement, is to act as a mentor – "this could be a very nice situation".

AM01 thinks of himself as a family person. Although working long hours, he tries to spend evenings and weekends at home. Not to neglect his family like most of the men in leading positions he knows, is a topic at home, when his partner says

> Hey, you will not manage, don't do it, the family will suffer, I think that I managed at least partly.

When their first son was born, AM01 went on paternal leave half-time in the second year, while still at university. This was a bad solution since pending work was always on his mind and he felt stressed when sitting with his small son at the sandbox while having an unfinished paper. When the second child arrived he took full leave for 6 (or 9) months

> Then all of a sudden Xmas was really Xmas and things like that, this was a grandiose experience.

Building things and building one's own work environment are life themes that we also found in some of the women's biographies. Some of them, in particular AF07 and AF08, find it extremely difficult to reconcile their commitments and dedication to work with having a family, and they only manage because they have supporting partners. AM01 seems to manage his demanding job. Leading a 'whole life', connecting the different worlds inside himself – the academic, the business world, family life – is important for him.

In the biographies of AM03 and AM04 we find somewhat different motifs and themes. AM03 had a strong interest in electronics and physics from his schooldays on. But he also liked psychology. In the end he studied electrical engineering. Just before finishing his degree, he started questioning the perspective of becoming an engineer and entered psychology as a second study. He describes this decision as a pretty idealistic one having no idea of the practical work of a psychologist. His motivation was to learn about how things are connected, "how thoughts work" and "how feelings work". For a while he thought of possibilities of combining electrical engineering and psychology e.g. in the field of brain research or user interface design, etc. Much later, after several disappointments, he gave up psychology.

At that point he already had had several well paying jobs as an engineer, always on a part time or freelance basis, since he wanted to keep his "freedom":

> This sort of freedom always attracted me. Even in my part time jobs I could work in my own rhythm, make my own timetable. I took the advantages of contracts, having assurance and so on, but most of the time I worked as a freelancer. It always seemed to be independency, maybe it is an illusion, but being dependant always was horrifying for me. Those 9 to 5 jobs are not my thing.

Most of AM03's contracts lasted for several years, and he says he never really had to look for new clients:

> I have got my clients through verbal propaganda, among them this firm that sent me to Asia for a project.

Since 2001 he is managing a huge project in the area of traffic technology, doing software development for security measures, speed control, etc. This is for the first time in his career that he is working as a project manager and he loves it:

> I am not the software developer any more, I have my team to do that. I have to do all the administrative and organisational stuff, and I am the coordinator for the software development. Of course I have to know the software by heart to be able to negotiate. … this is a several million EURO project…

AM03's career choices are highly motivated by his need of freedom. He would not accept any job that implies time restrictions or control mechanisms, even if he could earn much money.

> That is for some reason obviously something extremely important for me. To be in an inflexible scheme, to have a strict timetable like at school – that always was a horror for me. Something inside me works hard against continuity or periodical ways. I realise that again and again.

This is reflected in his personal life where he also tries to live with a minimum of commitments. The longing for independence AM03 expresses seems to result from an anxiety to commit himself to personal relationships – a typical male pattern in solving identity conflicts.

AM04 wanted to attend a technical school, but his father wanted him to become a lawyer. However, he had some computer-related jobs during the summer holidays and attended evening courses on programming, while finishing high school. After graduation he started to study development planning at the Vienna University of Technology.

> It was a sort of compromise… you have some dreams,… I always wanted to have something to do with architecture and development planning was something bigger, e.g. planning cities, etc., but I realised very soon, that I would not plan a new Brasilia in Austria.

So, he soon gave up his studies and went on working as a programmer for different companies. Finally he got a job at APA (Austrian news agency), where he liked the atmosphere of journalism as one of his passions always was reading newspapers. At that point he was already an expert for data bases development, so he got the job as a senior programmer. He left the agency after it had undergone major re-structurations and was recruited by a TV company, where he worked for several years as a software developer, then moved to system administration with a focus on data bases. He is about to change into a more technical department with planning and project management tasks.

> It is a change of tasks, more distance to the daily business, in direction of planning and more creative work.

His notion of a goof professional is that of an expert – he talks of the importance of "expert islands":

> It's not necessary to make a step forward in my career every two years. There is the hierarchical way in the IT-sector and the expert thing. …Somehow you become the wise in the background, the absolute expert in one area. There are people who would have the ability of leading people, but they decide to go an other way. … I am a little bit in between. The job is challenging, and there comes the day when young people are better in coping with the stress.

The other image in his mind is that of a generalist, who widens his horizon, is of the context.

> …I move two steps backward, make a break of half an hour and have a look on the whole picture. In the IT sector you tend to find the perfect solution for a problem, but it might be not an improvement at all for the whole situation, you might have to look for the real problem somewhere else.

AM04 lives alone in an beautiful apartment without a TV set and computers. He has many friends and plays music in a band. Although he considers himself as an amalgam of expert and generalist, and this without any formal degree, he is not particularly ambitious. AM04 wants to enjoy life without having to invest too much into his career.

IT as a hobby

Another difference (when compared to women's biographies) is the men's relationship to technology. There is a tinkering relationship in particular in two of the biographies. For AM02 it was clear very early that he would to something with computers. At the age of 13 he had a computer course at school and learned a bit of programming. He says,

> That was my world, great, absolutely great, I remember well. It did not take very long and I had my first PC at home. That was it, the computer was my top hobby.

Additionally he has always worked with electronic things, vehicles with remote control, etc. At the age of 14 or 15 he started to assemble parts for his computer, as well as develop media interfaces and other tools for the computers of his friends. That was when he earned his first money working with computers. He started studying electrical engineering but found this to be much more theoretical than he imagined:

> I was disappointed, because there was nothing with computers, there was a lack innovative subjects in the studies. It was really boring and took me a long time…

There was one course "programming for electrical engineers", he really liked.

> That was it. I said to myself: 'You are studying the wrong thing!' That very day, when I discovered, that I should change, I did it, changed my studies to informatics.

AM02 started his own provider company in 1997. This was nothing he planned, it just happened, because he bought a dedicated line which at that time cost a lot of money and decided to provide other people with this new and fast technology. Over the time he developed his company into a systems house, that offers complete solutions:

> …to offer complete solutions, where we do the telephones, the complete cable network, all the electric stuff in cooperation with an electrician. The client says, 'I would like a new office', and we do everything and cooperate with other professionals.

The company is still very small, with one employee and some freelancers. AM02 does the selling and acquisition part.

AM02's absolute priority in his life is his work. He turned his passion into a living. He is really fond of working with computers like when he was a young boy. Working 90 to 100 working hours per week is not extraordinary. He is not an entrepreneur, nor a technical innovator. He just happened to use the fast network technologies when they where first available and turned this into the basis of a company. The business aspects of his company are not really a topic for him. He mentions that he does not really calculate systematically. Being self-employed is important, since it guarantees that everything is in his hands, to be the manager of his own future.

AM02 is married to a computer scientist who no longer wants to neither program nor have much to do with technical stuff. She works in the background and does all the calculating but is not officially employed. His wife seems to live her own life. They have a young son who is attending kindergarten. AM02 says that he participates trying to keep the "family time" free. He is the one to bring the kid to bed - that is "father's work". He finds a lot of support in his wife, who not only does the bookkeeping, but is a partner for discussions, helping him to take decisions. AM02 always hears her opinion.

This bricolage attitude to IT, together with the skill (and luck) to turn it into a living, is something we did not find in women's biographies. AM05 is somewhat similar. He describes his interest in computers as having grown out of the relationship with his two best friends.

> … has always been in IT – don't ask me why, he simply was there – and we bought our first three computers … But to actually dig into technology, I started with the first 386s, that we configured ourselves, that we built up ourselves, and those were really expensive at that time.

After graduating from high school he attended a two-year programme in advertising and sales at the University of Economics. During this time he did jobs for small firms like helping out in selling computers or taking the screw driver and configuring a PC. His first real job was for a producer of wedding-dresses. He did there everything that had to do with marketing and

organisation - events like fashion shows and photo shootings, advertisements in newspapers etc.:

> Actually everything you can imagine, but in a very small, innovative team, that was known as the 'crazy Viennese'.

After three years he and a colleague started their own firm. They had a designer from the Netherlands and managed to develop a "quite a beautiful collection" that was produced in Asia and sold in Europe. They had orders, but many customers did not pay, and the bank stopped the credits. So after two years they had to close their business, with in the end not losing too much money. He then, through a friend, found his present employer, a broadcasting company. This was at a time when PCs were introduced, replacing the classical mainframe installation. As the department grew, he moved up in the hierarchy, first became dispatcher, and now is heading the IT department in charge of office computers and applications. He leads a group of 20 people and as he is also transient head of the complete IT department with a total of 56 employees.

Also AM05 turned his hobby – computers – into a profession. It started when he was young with tinkering and fiddling around and seems to have continued like this:

> Then there was partitioning and DOS, this was simply a quite different world. So I have grown into it from the basis, and it always appealed to me, those first connections via modem that you built up with friends, still via telephone … this was always fun. So it simply began. And it was not interrupted, our topic with friends was simply, when we met for four hours, it was exactly four hours EDP. Finish. That was it.

He has no formal education in computing and of attended all kind of training courses; but basically

> I think, that what helped me most, was when I dealt with it privately and simply found out what I am well, middle or badly suited for.

Also the story with the wedding-dresses, amazing as it sounds, has something unprofessional.

Several things stand out in the men's biographies. Being independent and building one's own environment are strong themes in all five of them. In all cases, except AM01, this resonates with being on their own and primarily accomplishing themselves. While AM01 has a vision and wants to build things – this includes taking care of his employees – AM02 and AM05 have looked for an opportunity to turn their passion into a living.

Curiously, none of these men (again with the exception of AM01) is particularly ambitious. AM04 has an almost hedonistic attitude to life. AM02 does not have a vision for his small company and he leads it in a rather hands-on way. The careers of AM02, AM04, and AM05 follow patterns that are accepted in the male world but they are by no means outstanding. Remarkable is also the bricolage approach to both, to technology (tinkering instead of analyzing) and to developing a company.

The family and in particular fathers play a different role in the men's biographies than in those of the women. AM04 comes from a family not at all close to technology, his father is a lawyer, his sister a costume designer. His need for independence seems to originate in his early conflicts with an authoritarian father, who tried to prevent his son from going into computing. AM03 says that his interest in technical things is rooted in the family. His grandfather was the founder of an enterprise, originally a garage. His main interest was in cars, their electrical systems, and tinkering. He held several patents. AM03 adds:

> Thanks god, my father sold the firm. I wouldn't have been happy with that, not because of the work itself, but I'm not a boss.

In AM02's family there a brother of the grandfather who had been a famous civil engineer. AM01's father was an garage mechanic before he quit to breed sheep. AM05's father, who died when he was 20, worked as a mechanical engineer. He resumes: "This is a long time ago, so no affinity towards IT." Talking about his father's job he says that what he did is "not a technology that we know - this was still classic technology."

Fathers (or grandfathers) appear in these stories as 'images' – the mechanical engineer, the entrepreneur, the lawyer, the garage mechanic – rather than parents who encouraged or gave support.

Summary

Our informants come from a variety of backgrounds. Most of them had the support of their family and in several cases it was a strong and encouraging mother who had a formative influence. The women frequently mention how important it was that parents gave them the freedom to make their own choice and that they trusted them to do the right thing. Early exposure to computers was not a decisive factor in our informants' career choice.

There are a diversity of entry routes into IT. Eight of our informants studied informatics, business informatics or technical mathematics. Five came into contact with IT at a vocational technical high school or technical college. Several come from entirely different fields .Some of the women entered IT after having worked in other areas such as marketing, accounting, secretarial work or tourism. One woman has a background in journalism, one in business studies.

Apart from those who embarked on a straight career in IT, women's careers don't follow clear patterns. Several women are too young to have had a career and they are still in their first jobs. Several of them have had their career in one and the same company, two of them with a classical university career and a third one, who moved within the company, a large steel firm with international cooperations. Eight of our female informants changed company at least once. This means that in contrast to the patterns commonly found in the IT sector, inter-company mobility is rather low.

Working in IT is strongly connoted with problem solving and mastering intellectual challenges. It offers the opportunity to be creative, to work with one's own ideas and, at least to some, also to get to the top.

In fact, the possibilities to move on are very limited in small companies. More than half of the women work in companies with not more than 30-40 employees. What our informants appreciate are the opportunity to do different kinds of jobs, to broaden their skills profile, and to eventually obtain more responsibilities in project acquisition and project management. Also attractive are young firms where they are integrated into small teams of young colleagues some of whom grow into friends. Career aspirations are higher among women in universities and some of those who work in large companies. Interestingly, moving into training and/or offering IT training for women is an attractive career option for several of our informants.

Two women (and two of the men) decided to build their own company, one of them together with a male colleague. In three of these cases the companies are so-called spin-offs where prior work as a university researcher helped to get the company started. The three spin-offs got some public funding and were fortunate to transfer some of their research projects into the

new setting. One of the women has kept her university employment. The main motivation in all cases is to engage in challenging cooperations with industry, doing something 'applied', but also to be the boss and able to define the directions the company will take. One of our female informants sees building up her own training centre as a career option.

Most of our informants like their work. They work hard and long hours. At the same time they have the flexibility they need. Time pressure and high work loads are experienced as a consequence of tight dead lines and accepted. This may have do to with the fact that few of our informants have young children.

Most of our informants are aware of the problems that women encounter in IT: not getting sufficient encouragement, having limited access and, when at work, being exposed to silent or explicit prejudices. This is a strong feeling among several of our informants and leads them to various engagements in support of women in IT. However, there are few reports of being disadvantaged, of overt sexism or of being mobbed. Several women mention that they enjoy working in a male environment.

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Biographical interviews – Synthesis report Belgium

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This document is divided in two parts. The first part proposes a transversal analysis of our female and male biographies, referring to the guidelines used for the interviews (D4) and constructed in reference to the model of explicative variables (D3). The second part proposes some women's profiles.

Part 1: Transversal analysis of biographies

1. Basic information about informants

This document reports on biographical interviews conducted with 20 informants, 15 women and 5 men. Their basic information is summarised in Table 1 below.

Table 1: Informants' basic information

	Sex	**Age**	**Marital Status**	**Child**	**Status**	**Degree**	**Job title**	**Organisation and size ***
MF	F	38	Married	1	Full time	Computer non university degree (3 years)	Project manager	E-department of newspaper groups (business unit) (S)
AL	F	33	Married	1	Part-time 4/5	Analyst (2 years university), university degree in library administration (3 years), complementary degree in information administration	Analyst consultant	IT service provider (L)
JMP	M	57	Married	2	Full time Freelance	Electronic technical engineer (non university)	Analyst developer	Freelance
CS	F	40	Single	0	Full time	Computer university degree (5 years)	Project manager	IT service provider (L)
KI	F	39	Single	0	Full time	Math (1 year) and computer university degree (5 years)	Business consultant	IT service provider (L)
BN	F	47	Divorced	2	Full time Freelance	Engineer (two first years), computer university degree	Development team manager	IT service provider (M)
CdB	F	39	Divorced	3	Part-time 4/5	Chemical degree, complementary degrees in coding and in adults training	Training manager	IT service provider (M)
MV	F	25	Single	0	Full time	Technician PC network in continued education	Technician PC network	IT service provider (S)
AD	H	50	Married	2	Full time	Expert surveyor and analyst (2 years university)	General manager	Computer supplier (M)
AO	F	31	Married	1	No job	Clothing engineer (Russia) Helpdesk support PC in continued education	Helpdesk support PC	No job
NC	F	31	Divorced	3	Full time	Web developer in continued education	Web developer	Internet services company (S)
KVA	F	38	Married	1	Part-time 4/5	Industrial design (high school) complementary degree in and integral development	Design manager	Internet services company (S)

NG	F	26	Married	0	Full time	Industrial engineer	Customer support engineer	IT service company (L)
BG	F	35	Single	0	Full time	Degree in graphics and network manager in continued education	Network manager	Social association (S)
FG	F	28	Single	0	Full time	Math and computer university degrees	Computer engineer	IT service provider (M)
SG	F	33	Divorced	3	Part-time 1/2 (another 1/2 as teacher of economy)	Computer two years, economics University degree and complementary degree in education and training technologies	E-learning consultant and responsible marketing	IT service company (S)
LNG	F	30	Single	0	Has been fired	Engineer	Was project manager (specialised in GED)	No job
PD	H	39	Married	2	Full time	Economy degree (4 years university); third level in administration computing	Senior consultant	IT service company (M)
DS	H	24	Single	0	Full time	Computer non university degree (3 years)	Anayst developer	IT service company (M)
SM	H	37	Married	3	Full time in a non secure job	Web Master in continued education	Web Master	Internet service company (S)

**: S= less than 20 workers, M= less than 100workers, L= more than 100 workers*

2. Education and the influence of the home

2.1 The family and the community

- Only some biographies confirm the classical hypothesis concerning social reproduction of career orientation and the role of family, particularly the role of fathers engineer or interested in mathematics. This influence can take two ways: on the one hand, the fathers who like DIY and initiate their daughter to non-traditional female leisure, who open their eyes to technical things. On the other hand, we find another influence of the father who acts like a counsellor or a role model for their children's choice of study: AD and CS's father had introduced computers in their firm when their children were on the verge of choosing their studies, it influenced them. SG's father, as an engineer, worked a lot, he really was the one who decided at home, the strong and helpful father on whom to rely for important decisions. Her biography clearly draws upon this family model.

- Mother's influence in this field is not really mentioned. Only one woman told us that her mother was the one who brought the first computer at home.

KVA was fond of DIY when she was a child. She preferred playing with tools than with dolls. She does not have any brother but her father is engineer. He liked to DIY a lot with his two daughters and showed them how objects were functioning. This father was also fond of photography; KVA describes her interest for industrial design as a result of her father's two influences. She chose scientific options and artistic leisure.

FG's father was blue collar but he was fond of mathematical games. She played with him when she was a child. Today, she and her two brothers are engineers. She explains why she chose mathematics and Latin as options in secondary school; Latin because one of her aunts told her that clever people studied Latin. She also added languages as a second option. Then she had to give one up because there were too many options; she hesitated and finally, after a discussion with her mathematics teacher, she chose mathematics. As far as her university degree is concerned, she hesitated once more between law, mathematics, physician, and other scientific options. What determined her choice for mathematics was that there was less diversity in the courses; most of them were mathematics. She started thinking that she would become teacher but finally dropped this project. Because she could not find any interesting job in mathematics, she went on with a degree in computer science.

FG Actually, in my family, people are rather on the scientific side: my two brothers are engineers and my father is a blue collar, but he liked, as leisure, to play mathematical games. For examples, he plays games in magazines, answers mathematical questions; … he likes to find tricks about figures. So he has always liked that, and when I was a child, I used to do it with him, I also had a little notepad in which I used to write down multiplication tables, little things like this. I would say that it is a taste that has always been in my family so in secondary school, I chose Latin and math; math because I liked it, and Latin because one of my aunts told me that clever people studied Latin.

NG decided to be computer engineer. She has always felt interested by math and sciences, do-it-yourself, all which is linked to sciences. Her father liked DIY and so did she (building models, radio controlled cars, etc.). Her parents had neither technical nor scientific job; her father was a translator and her mother a marketing woman. Her brother also chose computer studies. She early benefited from a computer at home, while she was in primary school, thanks to her mother's job. She spent a lot of time in front of the computer; as a teenager, her leisure was mostly DIY and computing. She opted for electronic studies; her parents agreed but asked her to do it at university level, so she did engineer studies.

NG At primary school, it is true that I preferred math, sciences and all that stuff; I had more fun with these branches and my practical side must have been visible when I was a child because I liked to dismantle things, and to know how everything worked. I used to play and DIY a lot. My father did a lot of DIY so we used to raise models, play with radio controlled cars, etc

- The hypothesis of the role of an early familiarisation with computer is not really demonstrated for women. If it is true that we find some women who had an early familiarisation with computers associated with an early and strong interest for computers, these trajectories are not frequent. Yet, we have not met anyone who had an early interest for computer and wanted to make a career in computing without having a PC at home or having had a contact with computer. Yet, the "generation effect" must not be forgotten here, these women are all around 30 years old today and were children and adolescent at the time when personal computers entered home.

LNG (who studied engineer) I remember that in primary school, we received a little computing lesson, we had been taught LOGO language, I think, with a little turtle, we could draw circles, squares and so on, and it had watered my mouth already

- The majority of the women we have interviewed took different routes to computing. Many women came to computing without any familiarisation with computers. Some of them also choose computer science despite the fact that their whole family (brothers, sisters, parents) had no scientific, mathematics or technical orientations. Choosing computer science can also be the result of hazard or elimination of other choices.

AL chose informatics by eliminating other choices, after an inventory of what she did not want to do. What she wanted was a degree that would guarantee a quick job, because she had

a child. In another circumstance, she would have chosen something else. She soon realised that she had made a wrong choice but because she was determined, she went on until she could get a degree, which took her two years; then she looked for a reorientation without losing her two first years. "Spending hours writing codes to make something a quarter of a second faster" did not appeal to her. Before entering university, she had never touched a computer in her whole life. Being a young mother (at 16 years old), she was supported by her family. In her family, there were 5 children all destined to embrace university studies; her father also studied at university (linguistics), while her mother stayed at home. All her family has literary degrees; she is the only one to have chosen another orientation. She grew up in Spain.

MF is 38 years old; she became computer specialist "by accident". Today, she manages a computer service that works for two big press groups. She chose computer studies by eliminating other choices and because she liked mathematics and logic but she did not feel able to be a teacher. She had never touched a computer before beginning her computer studies. She was asked by her parents to choose a 3 years non-university degree because her brother was also studying and it was too expensive; one had to stop, it had to be herself. Her brother became engineer. Her family can be described as very traditional as regard to gendered roles; today, after a 20 years long career, it is still her brother's career as an engineer that makes his father proud, not hers. She can be manager of a computer service; it is good but not important.

MF Well, I chose mathematics at secondary school because I preferred math than French and I did not know what to do at the end of my secondary education. My mathematics teacher advised me to be a math teacher but I was afraid of teaching. I did not feel able to stand in front of a classroom. He told me about a computing degree, but you must know that this happened 20 years ago, and I did not know anything about it. I looked for information about it and asked my self "why not?» Then I learned that there was a three years non-university degree, I tried and succeeded. In these studies, I found a great deal of logics, like in math and it was all right with me. Yet I did not go to university because my brother was also studying and it would have been too expensive. One had to stop; it had to be me.

- In some cases, the math teacher played a role in the orientation, but only when there is already a strong interest for mathematics. In these cases, informatics is often a second choice advised by the professor to someone who does not know what it is; it is presented as something close to mathematics but without its abstraction or providing the girl with other job opportunities than only teaching.

  FG I discussed my choice of study with my math teacher because he liked me, as I was one of his pets, I was one of the first in his classroom. He advised me to keep math because it was something harder to catch up later.
  MF I chose mathematics at secondary school because I preferred math than French and I did not know what to do at the end of my secondary education. My mathematics teacher advised me to be a math teacher but I was afraid of teaching. I did not feel able to stand in front of a classroom and he told me about a computing degree.

- The choice of computer science can also be a reorientation after the interruption of curricula for different reasons. In these cases, the role of the family is less important and the choice is a personal decision.

CDB chose scientific studies, at secondary and superior level; she got a chemistry degree and finished her dissertation in the United States. She had planned to work in the nuclear field but this milieu was too closed to women. Her studies oriented her towards genetic research, but once again, young women are supplanted from these laboratories because of pregnancy risks and she was given uninteresting jobs. So she came to computers, because her grandmother, with whom she lived, had seen an advertisement about computer studies and suggested her to

choose this way. She did not feel attracted by computer and only knew rudiments. Thought, she decided to make university studies in informatics and followed them without any difficulties. She hoped that this new degree would open the door of a more egalitarian professional world. Around a third of the students were women, she firstly worked for the university and then in the firm where she is now.

NC is 31 years old. She finished her secondary school and tried one year of medicine studies without finishing, afterwards she began tourism training, without ending it either. She stopped her studies and decided to work, but was only recruited for non qualified jobs like receptionist-telephonist and security agent, then she stayed for three years at home to take care of her children, aged from 2 to 7. She felt that she was able to take more interesting jobs than the ones she had known but could not find anything without a degree. That is what encouraged her to start a new training. At first, she was interested in clerical work, something that would allow her to take a new start. By accident, she assisted to a web designer information session, in an adult training centre and it deeply interested her. She did not know anything about computers and even rather had a negative vision of them: something non-human, very technical. Today, she has changed her mind.

2.2 The school

- Hypothesis concerning the school climate are not confirmed with the female biographies, be it in engineer studies or computer science. Our women never mentioned the fact of being in minority in large groups of boys as a problem. They did not mention either any specific attitude of teachers as regards to girls. Some hypothesis concerning the chilly climate, the exclusion of girls or the gendered attitudes of teachers do not appear relevant for computer science.

MF was in a class of 3 girls and 25 boys and it was not problematic for her. She thinks that it is more difficult in the work environment than at the school level.

When AL started to study computer science at the university, there were 6 girls and 94 boys in the group. What surprised her was that the only thing that seemed to interest these boys was "informatics, informatics, informatics".

CS started her training in computer science without any knowledge of computer. She finally noticed that boys who were more familiar with PC had more difficulties in their studies. They lacked analysis ability, global vision and they were often tempted to go directly in a concrete, but often wrong, direction.

KVA has always had more boyfriends than girlfriends during her studies, and already at primary school.

> *NG I think that one gets used to it… At school, I was sometimes in the minority, sometimes the majority, but one finally gets used to it. I was in an only girl's secondary school and went to an engineer high school with a majority of boys, but nothing troubled me or disturbed me, I have always been in the group, never left on the side. No one ever made any difference and it is the same here.*

2.3 Personal attributes

- There are also some strong characters in our biographies, some women who maintained their orientation choice despite external difficulties or opposition of their familial environment.

NC had no degree. She is a mother of 3 children, aged from 2 to 7, she decided that she was able of doing something else than the "small jobs" that she had done (telephonist, security agent, …). She engaged herself in continued education for one year (including six weeks of trainee period). She did not receive many family or friendly support; they did not accept to see her stand on her own feet and decide to live for her. Her husband did not agree and they divorced. At the beginning, he was happy that she could take part in this training, he thought that it would be interesting for her but had not realised that a job would follow the training … into which she would put all her heart. He had a small job in mind, maybe a part time, just to have a complementary income. When she began to live in a more independent way, he could not tolerate it and hoped that, because she was pregnant, she would not be taken on at the end of her traineeship but she was. He denied her abilities and argued that she must have seduced her manager. Even her friends and family did not believe in her and could not realise that she would be hired for something else than helping coffee and answering the phone.

LNG lost her mother when she was at the secondary school. She lived with her, a black woman, and her two sisters; her father, a white man, had left them when she was very young. After her mother' death, she and her sisters went to live at their uncle's who already had three children. There was a PC there. It is there that around 15 years old she had her first contact with a PC. She started to develop small programs in Basic with a book for fun. She was good at school; she wanted to be engineer, despite the fact that the family was sceptical. For them, it was not a female profession. Moreover, they were not rich and not convinced that she was able to succeed but she did.

LNG When I decided to follow engineeing studies, my family was not happy; they said that it was not good for girls, that it was not a job for a girl. So they did not push me at all to do that, it is the opposite! I was at my uncle's and his wife, with their own children, and I chose the longest, the most difficult and most expensive studies. They really were not glad about it. At the beginning, they used to tell me "You are going to fail, you are not even going to pass the entry exam".

- Some women describe themselves as very rigorous and logical, and as different from their female counterpart. They usually get on better with men, and this was already the case as girls, when they could be qualified of "tomboy".

NG I have always been different from my girlfriends. Not in primary school, where I used to play with toys, but at secondary school, I did not have a lot in common with my counterparts.
KVA When I was at primary school, there were nearly only girls in my classroom, I think there must have been 3 boys for 20 girls, and I, I used to play with the boys. Yes, I would say that I was looking for the boyish side…
BN I was a very good student in mathematics, I really liked sciences and was very logical; that is how it was. I never really got on with women, who are so illogical. Math and computing are logical; it is 0 or 1.

2.4 Entry routes to computing

- As regards hypothesis draw out in the state of the art and concerning the determinants or school orientation and routes to computing, some preliminary conclusions can be derived from these biographies:
  - There is not any need of an earlier familiarisation with computer; many women have chosen computer science without any preliminary contact with computer.
  - The role of family and /or father is evident in some trajectories but not in a majority of biographies.
  - There is no determining links with an interest for scientific or technical matters. An interest for technical matters, such as electronics, appears only in two biographies.

  - For many women, there is an obvious link with a strong interest for mathematics. Computer science appears as a substitute to career in mathematics (more difficult or restricted to teaching) or to failures in mathematical studies.

- Nearly none of our informants directly chose to study computer at university after secondary school. They usually did math before, either a whole degree or just one year, but it must be said that the study choice was not wide for the ones who wanted to study computing at university, they had to do math or economic for the two first years in many universities.

- Many of our informants told us that they liked mathematics, and this is what pushed then towards computing. Also in some reorientation cases, the choice of informatics is also linked to a past interest for mathematics. Looking at their professional trajectory, we see that these women began their professional life in the hard core of computing, usually being developer. Then, with the passing of time and thanks to their degree and experience, some moved towards more customer oriented jobs or towards more managerial activities.

MF was good in mathematics, her math teacher encouraged her to go in this way but teaching did not interest MF. So her math teacher suggested her to choose informatics. Before starting her curricula in computer science, she had never touched a PC. It was 20 years ago. Now it is a passion.

At around 15 years old, CS started to be interested in mathematics. She started a degree in mathematics at university but did not succeed the first year. Her father was engineer (brewer) and at this moment, his firm was introducing informatics. He followed a short training and told his daughter that she would probably be interested in computing too: there was many mathematics and "it was like a puzzle." That is how she decided to study computer science.

KI wanted to study mathematics. She saw the orientation to computer science as a new opportunity linked to mathematics. She had the impression that there were more interesting lessons in this orientation than in mathematics. So, in 1983, she decided to take this orientation. At this time, she knew nothing about PC; only that they were big calculators. She directly found it interesting even if at the beginning, it was quite hard. Some other students were already familiar with PC. However, she noticed that these students had to forget what they already knew.

BN started her curricula with two years of engineer. Then, after a long interruption (she get married and had 2 children), she completed a university degree in computer science and got her degree at 30 years old. She started to work as developer and created her own company; a few years later, a larger firm bought it out. She is now freelance and responsible of her former company, which is now a department of the larger firm. She works with 12 developers who are all young men (23 to 30 years old). She first planned to be engineer. She made her secondary school with scientific options. After her interruption of some years, she wanted to complete her curricula but she says that it was too late for engineer (27 years old) and not possible with two children. So, computer science appeared as something compatible with small children because it was possible to work at home.

FG started with a university degree in mathematics. As she was happy in her student life, she said "why not doing two more years in computer science?" it was said that for those who had already a degree in mathematics, it was easy. Furthermore, she though that finding a job after a degree in mathematics was not easy, but on the opposite, when she finished her degree in

computer science in 1998, there was not any problem to find a job; she received offers at home and just had to make a choice.

- If the interest for mathematics is frequent, technical things only attracted a part of our informants.

NG was interested by electronics. As her parents wanted her to go to university, she decided to choose industrial engineer (electricity section, computer science option). When she was a young girl, she was attracted by mathematics and sciences. She did DIY a lot when she was young; it was a favourite activity. She did it with her father who was translator and helped her to do her homework in non-scientific matters. She has a brother, and both are fond of PC. It is her mother who, as a commercial, brought the first PC at home. Since primary school, NG has spent long hours in front of the PC with her brother.

LNG was good at school. In secondary school, she studied Latin, Greek and mathematics. She started a degree of engineer architect after having eliminated many other possible orientations. She did not succeed the first year because of deficiencies in science. As her parents agreed to pay her 5 years of study and because engineer architect was 5 years; she turned to a high school of engineer rather than university, where she could get her degree after 4 years. After the first two years she chose robotics as option. She says that she made this choice because she was Yoko Tsuno's fan.

- New jobs related to Internet and new media are seen as opportunities for some women, already holder of a degree, most of the time a university degree. Seeing, on the one hand, their sector's crisis, and, on the other hand, the boost of Internet and new media, some decided to change their professional sector. Others were simply bored with their job and interested or curious about ICT and Internet, which represented a real challenge. Being part of this Internet revolution motivated them. All these women entered these jobs related to Internet and new media thanks to continued education; indeed the jobs are new and there are not many initial curricula yet, and furthermore, in Belgium, continuous training offer is wide and can lead to degree equivalent to superior non-university education. The level that they reach is off course less qualified than a university degree.

SG is a teacher. She teaches economy and accounting. Two years ago, she decided to start a new training and chose a degree in technology for education and training; in which she thought that her experience as teacher would be an advantage. She had a contact with a small company and was asked to work for them. She still continues to be a teacher for a part-time and she works part-time for this small company. It is a lot of work but for security reasons she does not want to stop her teaching activities. She prepares e-learning projects and trains the future e-trainers.

MV was interested by informatics. At secondary school, she had a male informatics teacher who she found really fascinating. She felt very talented in that. She had a PC at home. However, her parents were very strict and she was not allowed to choose her orientation herself. Her father was a blue collar and he did not allow her to choose informatics. He though it was a sector without future. She tried other curricula without success (nurse, nursery, ...). At 19 years old she decided to leave home and to reside with her boyfriend. She did many small jobs. After some time, she decided to learn informatics. Her boyfriend supported her. She started a two years degree in analysis/programming but quickly gave up because, after her personal trajectory, she did not fit in the school environment. She searched through Internet for adult education and finally applied for a training of technician PC

network (six months including one month trainee period). She liked the mix of informatics and client relation.

AO left Russia some years ago. She had a curriculum of three years in a technical university. She likes mathematics. As her diploma was not recognized in Belgium, she started an adult training as helpdesk support PC (one year including trainee period). In Russia it was normal for a girl to choose a technological orientation.

- Others chose informatics after elimination of other possible choices but with no specific interest for this area, only the project to find a secure job. Hazard and opportunities also play their role in the study choice.

Before starting her training in computer science at university, AL had never touched a computer. She chose computer science not because computer did particularly attract her but because, as a very young mother, she needed a degree that could provide her with a job as soon as she would leave university. She says that without this constraint, she would have chosen something more artistic. She rapidly noticed that computing was not a good choice for her, but as she has a strong character, she decided to achieve the two first years in order to have a certification. In her classroom, there were 6 girls with 94 boys. So she reoriented herself without loosing her first degree, still at the university level, in the area of library, documentation and information science. She met her future husband during her computer studies. Both of them and a friend of hers stopped after two years, they were disappointed by informatics. Her husband studied law at university.

When she was young, NC found informatics not attractive at all, not human. Now, after an adult training in web design, she thinks that it is really a human work, with many contacts. Before her training, she had not had any contact with computer.

Before coming to computer, BG followed graphics training and taught graphics for 5 years before she lost her job. She did a complementary training in social legislation and worked some time as adviser in social legislation. Her job was not secure, so she decided to take another orientation. As she thought that it was a deficiency to know nothing related to computer, she started an adult training in this field (as network manager). She found it very difficult for the six first months.

> *BG It has been very hard during the first year, I felt that my keyboard was engraved on my forehead all the time and I was so depressed. I have suffered from headaches for 6 months. I had studied literature, I had done graphics arts, I had done something I could master, that required study and understanding… everything had always been so logical, and suddenly, I was in a world that required math, some illogic and asked me to let go sometimes on a few notions and this was very hard… I wanted to give up many times and fell lost many times too.*

- If we have a look at the male biographies, we can see some convergences and divergences, keeping in mind the restricted number of male biographies. The link with mathematics does not appear in the male biographies. For the men we have interviewed, computer science seems rather connected to economic matters. However, we also found the choice for informatics after elimination of other possible orientations, the reorientation trajectories and the choice of informatics despite any preliminary knowledge in this field.

AD-man studied to be expert surveyor at university. It was a choice amongst others, not very well informed maybe. After 5 years of professional life, an opportunity occurred to work as a commercial in the computing sector, he seized it. In order to know what he was speaking about, he went back to university and did 2 years of computing. He never liked coding and did not understand that he had to know how to write in code in order to be successful as a

commercial. He thought it was too technical and did not find it useful. What he wanted was to be a commercial; the computing field was a hazard.

When PD-man left secondary school (in 1981), he already wanted to study computers, but not developing, what he wanted was to organise computerisation of firms. Indeed, when he was a young boy, his father, who owned a society, had installed the first computer in his firm. He had showed it to his son who was bewildered by this computer that took half a floor! His father died when he was 6 years old and he wanted him to be proud of him, if he could see him. So, he logically chose economical sciences with computer as an option. He failed and went to another university where he did not have the opportunity to take computer in economy, so he finally graduated in economy but his thesis was in the computing field: the computerisation of an SME. After that, he did a master in administration computing.

DS-man chose to do computers studies (3 years non university) because he did not feel able to do anything else, and even that, he did not feel able to succeed. He had chosen math and drawing at secondary school, it was based on creativity. He likes drawing but says that he does not have any imagination, it is too abstract and he defines himself as very “square” and logical. One week before the beginning of the academic year, he still did not know what to chose so he went to an orientation centre where he was advised to do computer sciences, but he answered that he did not like that. Yet, one of his friends told him that his brother had manage to succeed in the same school, so he should manage. So he did it but it was not a thought choice.

SM-man came late to computing, through further training and with a first degree of clothing design. Seeing the evolution of computer graphics technologies, he decided to be trained in this technology, in relation to clothing design. He began with computing initiation, then computer graphics initiation, worked for 18 months in which he had to build a web site. This attracted him and he got a degree of web developer. It is the creative part of computing that attracted him.

- We can summarise the routes to IT professions as follow:
  - Through initial training
    - By choice and interest
    - After elimination of other possible orientations or as a hazard
  - Through continued training
    - After another degree in another area
      - As reorientation
      - As complementary training to the initial degree
    - With no other degree before

3. Job histories

3.1 Finding a first job

- Finding a first job was not really a problem, with some exceptions, such as LNG and MF.

As a young woman industrial engineer, specialised in robotics, LNG wrote around 200 letters and it took her six months to find a job. This was in 1997. The first job she found was analyst/developer in a small firm, but it was too far away from home so she left during her trial period and was taken on by a major telecommunication firm as a software developer engineer, mainly in the area of phone exchange. It was a very large firm where she felt like a number. She also found this experience a little boring and left after 2 years. She then became research engineer in the field of "off line programming of industrial robots".

MF, who has now a high position in an IT department, started as clerical worker because she was lacking of self-confidence and had no success when she applied for IT jobs. It was 20 years ago.

> *MF When I graduated, I did not manage to find a job in computing because at that time, it was not the rush yet. In each hiring interview, I was told that I lacked self-esteem and could not sell my self. This did not help me finding a job! It is by coincidence that I ended up in a press group as a clerical employee; I replaced an ill person and did not touch any computer. Later, a computer specialist left the firm and, knowing my degree, they offered me the job (20 years ago).*

One of our male informants, despite a strong curriculum, had some periods of unemployment. He had worked in commercial functions but did not feel well in these jobs. He said he was not able to sell things in which he did not believe.

- However, for all the women who graduated in computing, there was not any problem to find a first job even if we also notice the effect of different periods, well known in the ICT sector.

AL found directly a job as analyst consultant in an IT service provider company (1993).

NG found her job before the end of her studies of computer scientist (2000).

FG finished her degree in computer science in 1998. She received offers at home and just had to make her choice. She started her first job in a large IT service provider, just for the reputation of the firm and because it was not far from her home. She rapidly found that what she was working on was old technologies, and that she did not learn anything. Moreover, the working environment was the one of "civil servants" to which she did not identify, so she applied in another IT service provider firm. She is now in a high-tech firm where the average age is 30 years old.

- Women's external mobility is restricted because of family duties, external constrains and part times. If we compare men and women's trajectories, it is clear that the impact of a child is less marked in men's biographies. The reasons why men and women apply for new jobs are partly different: when women change job, it is often because of boredom in their previous job or in reason of lay out or restructuring, it is also at the occasion of a reorientation. Men, but also some young and with no chil women, change job in order to build their career.

  LNG The job, I think it was very monotonous and it was often difficult to really tell what I was doing…I was under the impression that I was one number, my knowledge was reduced to a little part of the process, while I would have preferred to have a global vision.. that is why I left.

AD-man explained that he changed job every 5 years, so he must have worked in around 4 IT firms. His departures were his own choice, because it was another stage in his career development. If he had stayed in the same firm, his career evolution would have been slower. He said that this kind of trajectory was typical of the IT world; it is a way to bypass the lack of hierarchy levels in IT firms.

- Only one woman is still in her first job after a long period (for 16 years now). Most of the others have changed more than one time, most often on their initiative. She explains that she stayed in this firm, which is not an IT firm, because she had the opportunity to do many different things.

After her curricula, CS entered in an IT department of a large industrial firm. She has been working for 16 years in this department and has done many different tasks: programming, analyses, development of methods, training, … This explains why she never felt like leaving, because she always did new things, in different fields, with different people and at different responsibility levels. Today, she is project manager for the implementation of SAP in the firm for Belgium in collaboration with Spain.

- For those who came to computer through adult education, it seems more difficult. They are often engaged after their training period but not always for long periods. However, their main problem is the financial recognition of their training. They are often doing interesting jobs but for low wage. For them, jobs changes are not mainly voluntary.

MV and NC found a job where they have done their training period.

BG says that it is difficult to find a good contract with a good salary in this field with a curriculum like hers (graphic, than social legislation, than network manager). She thinks that she will probably start a new adult training but she is not sure whether it will be in the computing area.

NC was taken on at the end of her training period despite the fact that she was pregnant of her third child. She really thinks that this is a strong recognition of her competencies and is very proud of that. Her husband could not understand this; for him, this was a signal of some interest of this employer for his wife.

NC It is very significant for me that I was taken on being pregnant, it shows that they put more emphasis on people and on their abilities, on what they are able to do, rather than on other considerations that do not matter in the end.

- For family reasons, one of our informants chose to be freelance from the beginning of her career. It was a choice made in order to have freedom and mastery over her working time.

BN started as a freelance but mainly working within a company. She had two small children at this time. Being freelance gave her freedom as regards working time. She used to come back at home at 5 o' clock for the children and then started to work again in the evening. She says that it would not have been possible with a salaried status and thinks that women have more choices to make than men. She considers that it is not possible to find solutions. If women want children they will have no professional perspectives as long as they are young.

3.2 The present job - Tasks and skills

- For most of our informants, the first job did not result of a real choice, it is some kind of hazard and success in applications. It is only after getting some experience that they usually look for jobs of their choice. Those, men and women, who stay in their first job or in their first firm, are extremely rare.

- We can see that women generally prefer analysis to programming, interface functions and human contacts with clients or colleagues. They do not like boring work; they are interested in creativity in work, in innovation. If they start their career in the hard core of technology, it is often followed by less technical functions and more hybrid competences. They are not numerous in high positions. Consultants are rare, most often single. Those who have middle management positions do not have any children or have grown-ups.

AL found her current job through personal relation. She was analyst consultant in her former job and she is still analyst consultant in her current job. She works in a team of 40 persons composed of analyst, developers and system engineers. Among the consultants there are 4 women. All the developers and system engineers are men. The director is a young woman. AL describes her job as composed of 50% of technical competences and 50% of other competences. She is not passionate by informatics as such. She is more oriented towards interface function. She does not like programming.

> *AL My job is how to structure information or documents or information belonging to documents in computer systems, so that these information or documents can be used in a more efficient way in any computing application. It is actually document administration, but this word "document" is blur and is always becoming more blur in the computing field; so we prefer to speak about information administration, at the level of paper information or of information held in a document. It is a very creative job with many contacts with customers.*
>
> *AL Spending hours trying to make a code perfect only to win two quarters of a second is not my cup of tea.*

KI is business consultant for a large IT service provider. She worked for the 3 largest IT service providers in Belgium. Her job consists of analysing the client strategy, his objectives, his process, resources and IT systems. Then she makes a diagnostic and proposes advice to reorganise the IT systems. She prefers analysis to development. She does more organisational diagnostics and management than informatics as such, even if she has to be aware of the trends in this field. She decided to leave her former job of consultant because she was not motivated anymore by this job; she found it boring. In her current job, she says, "it doesn't matter if we have to work long hours if the job is interesting". She prefers this work environment. KI explains that there is a good cooperation between colleagues because everybody knows that they will need help one day or another. She thinks that she needs some additional knowledge in micro-economy. As business consultant, she states that IT competences are not sufficient.

KVA joined an Internet service company after some years in industrial design and communication because she knew the director of this company. She started to work more as a computer graphics artist. KVA has hybrid skills. She comes from industrial design, now she is

design manager for the creation of web site. She describes her competences as a mix of three competences: economy, technique and ergonomics.

When MF began her professional life, she was not self-assured and still today, she finds it hard to take over her manager role and prefers dialogue to authority. At first, she did not arrive to "sell" herself as a computer specialist and worked as an administrative worker for a daily newspaper. It is when a computer specialist left the group that, knowing her degree, she was offered his job. Her self-esteem grew from then on and, finally, she replaced an older computer specialist who had left, she became team manager. She followed some additional training in specific languages. Now, she is responsible for informatics for two newspaper groups. Her unit has been externalised as an independent business unit. MF is responsible of a team of three persons, mainly male developers. One of them had applied for her job, now he refuses to be supervised by her. She makes the pre-technical functional analysis related to the management of two newspaper groups, all what regards accounting, subscriptions, sales, etc. She is passionate by her job, what she really likes is not developing but analysis, "realising the client's dreams".

MV is doing installation and cabling, support for PC and networks.

NC is web designer but is also very polyvalent. She works in a small structure. She feels that her role is more important than if she were in a large company. What she likes in her job is that nothing is fixed; everything is flexible, modular, as in human relations.

> *NC I think that this is what I really like, the fact that nothing is firmly fixed and will never move again. Everything is modular, like human relations where nothing is fixed and where one has to be always ready to evolve.*

NG works in a large company providing customer support in network management. Her firm is a provider of worldwide network systems. She received a 10 weeks training before starting the job but she thinks that the reality is even different and she have to learn a lot by doing. She explains that it was quite hard at the beginning.

> *NG Most of us arrived here with a brand new degree, very happy to have found a job but absolutely unable to do the job! So the 10 weeks training we got was great and taught us a lot.*

FG is consultant. She is engineer in computer science. At the moment, she mainly does programming, in Java with some SQL. In her company, it is the first level for engineer. She has to do that for two years, and then she can become project manager. They work alone behind their PC but they are in a group, they interact a lot. She works at the client, always in team with some colleagues. They must have a team spirit. She prefers to work with people coming from the same curricula. In her firm, there are many people who have a university degree but not in computer science; the firm has trained them. But she thinks that it is easier to work with people like her who have done a university degree in computer science.

CS is project manager for the implementation of SAP in Belgium for her firm (very large international firm) in cooperation with the firm in Spain. This supposes regular travels to Spain.

BN is responsible of a team of developers but what she likes is analysis, listening to the client and then translating this in a job for developers.

> *BN It is not developing that I like in my job, it is analyse. What I like is to listen to the customer who explains to me with words what he needs, and the fact that I am able to write it down and put it in computing shape so that I can hand it over to a developer who will work on it. My job's essential part is analyse, is doing database modelling, and in that aim, being older is not needed, but having a stature is, because at one time, one will have to assert himself in front of the customer.*

BG is network manager in a non-profit international organisation. She has been trained through adult education and has network, HTLM, Basic, web design and database knowledge. She is responsible for everything around computing in this organisation and is the only one who has knowledge in this field. She has a contract for 3 years, works a lot and is not really well paid.

- Job losses are not frequent, particularly for those who have an initial degree in computer science. One woman who is industrial engineer has been fired because of a conflict with her hierarchy. Some women who started a new orientation thanks to adult education have sometimes less secure jobs.

LNG was project manager in electronic documents administration. She lost her job two weeks ago because of a conflict with a boss. She was working in a company specialised in the integration of application in the area of electronic documents administration and workflow. She was the interface between the clients and the developers who followed the project from definition to validation.

3.3 Working time

- Not surprisingly, the problem of long working hours is mentioned by most of the informants. One of our female informants is really endorsing the dominant model that put work requirements as the highest priorities. The men who do so do not often have external constraints and either are still living with their parents or have a wife at home. The over-investment in work gives more advantages to men than to women: the ones who adopt the male dominant model of work do not obtain the same return as men in terms of wages, advantages, careers, and responsibilities.

BN's job is her priority. Her developers can have constraints and ask for flexibility but the priority is that the job is done. She pays each supplementary hour but work has to be done in time even if it requires working in the evening. She works "all the time" and lives alone; her children are grown-ups and she is divorced.

> *BN Timetable!!! Well… Yes… I would say from 8.30 until 6.30, plus some Saturdays, Sundays, some evenings and nights… it depends, and it is the same for the developers.*

FG explains that she sometimes has to work long hours but she considers that this is compensated by her high salary.

> *LNG We were supposed to work, let us say, 39 hours a week or so, but there were some days where we used to work 12 hours in a row, 10 hours, but it was usual to work supplementary hours. For example, on Fridays, we were supposed to stop at 4.45, but it was extremely rare that one could leave so early; we used to stay until 6 or 7. Well, there was often a drink in the end that stretched the day, but as a result, we had stayed there longer than we should.*

JMP-man is 57 years old and lives in a traditional family where his wife is the main housekeeper. He admits himself that he does not help a lot and that his wife complains. He used to take children to school in the morning when they were young because being freelance, he had the timetable he wanted.

AD-man works a lot (around 12 hours a day) and does not count his hours. He has two sons of around 22 and 19 years old who are students. His wife must do a lot at home.

- The other women seem to suffer from this pressure on working hours. Many women express there lucidity about this vicious circle in which they are obliged to function, even those who have few external constraints. It is like if there was a continuous flow between work and life outside work. Some, but not all of them, have tried to put limits to their job,

knowing that if they do not, they will end by working 15 hours a day. Yet, this does not prevent them from working extra-hours. A man also has this kind of lucidity: after a serious car crash with his family (wife and two young daughters), he realised that he was spoiling his family life. This led him to important decisions such as a paternity leave. Another young man, working as a developer, does not want to work longer than his working day either.

- *CS-man I am not married and I do not have any child either but I try to keep the balance as well as I can. Sometimes I work a lot but that is how it is.*

AL notices that long working hours are a vicious circle from which you cannot escape and in which people are doing more and more. She finally ended by working 15 hours a day.

AL Before my 4/5th working time, I felt under pressure. I was under the impression that I had so much work, I used to work an average of 10 hours a day, and again during the week-ends. But one feels bad because in the end, one feels that he is not able to do the required job in the supposed timetable. It is a vicious circle; people see that you are able to take on so much work so they go on giving you some! And then, one wonders when he realises that you are working 15 hours a day! "How did you manage until now?" That is why it is important to show the limits from the start; if not, one falls in the trap and it is hard to get away.

CS is afraid of her working time and of her colleagues'. Many time in her interview, she said "where will we stop?" to finally conclude, "if I make a report between the number of hours I work and my salary, I thinks that I earn less than a housewife." It is possible to say no but there is a risk. She cannot manage to take all her holidays.

CS I am not the only one who works so much, half of my co-workers do the same. Nobody obliges anybody and this is crazy! Deadlines are there, everything is so there that everyone does it, and it is a real vicious circle and I sometimes wonder where it will stop. Because in the end, it is not normal at all. Why does everyone do it? It is a good question; I hear it everywhere all the time.

Since PD-man had his car crash, he sees life in a different way. He has decided that his family was what mattered first before his job. He now shares family duties with his wife despite their high level jobs and they make turns to go and fetch the children at school. When it is up to him, he leaves his job at 5 but when it is up to his wife, he works longer. Yet, he has stopped coming back at 10 pm. His working time is very flexible and he has to travel a lot but he can organise himself. The job is shared in his firm and other workers are able to replace him if needed, this is what happened when he took his paternity leave.

NG does not control her working hours; it is as if "a little voice whispered to stay after 5 pm". Only weekend supplementary hours are paid. Her husband used to complain because she usually did not come back before 8 pm, so she tries to finish earlier. He is industrial designer and in his job, supplementary hours are all taken into account and, by consequence, better controlled.

KI works at the client, so she travels a lot, sometimes stays for some months abroad (UK, Spain, Canada, …) When the client is too far from home, the firm rents a flat for her for the duration of the project. Between two projects, she comes back to the office; she calls this "the holidays". When she is at the client on a project, she works long hours. KI works a lot but she never works at home. She wants to put a barrier between work and private life.

KI When I have a lot of work, I stay here at the office; I do not bring any work back at home. I try not to do this. Home is home; I do not work at home. Work stops as soon as I close my car's door. Sometimes, while I am driving, I give a few phone calls but except this, it is all. I try to put limits. This is also why I do not bring any work back home. If not, one goes on and on… Some work until midnight or more, I do not want to do that.

MF explains that when she complains about overtime, her director's answer is "it is because you chose to do it; you are not obliged". But concretely, it is not possible to do anything else. Sometimes she works during the weekend. She only has 20 days of holiday per year. There is not any overtime catching-up system.

- Working time reduction is a high price to pay to gain some freedom as regards working time. This is mainly a female solution. It often consists of small reduction of contractual working time, from full time to 4/5, in order to be able to better conciliate family life and professional life. This has very few incidences on the workload, mainly on the organisation of working hours, and of course on salaries and career perspectives. In IT jobs, nobody applies for part-time, women are taken on on the basis of a full-time, and the arrival of children usually initiates their demand of working time reduction. Yet, once granted, it restricts women mobility because jobs offers never propose part-time job in the IT labour market.

AL Her firm counts around 40 analysts, among whom one finds 4 women (including herself) and one young woman manager (35 years old). Developers and engineers are all men. Amongst the 4 women, 3 work part time (4/5), always a choice for the children, except for AL whose son is 17 years old; she made her choice for personal reasons. She does not know any man working part time. She did not have to fight to obtain her part time, only to say if it was temporary of definitive. Before taking this part time, she used to work 10 hours a day and often at weekends. Many people work more than 10 hours a day in her firm, but it constitutes a vicious circle. People believe that if others do it, they also have to. Once in the circle, it is hard to escape. Since she has reduced her working time, her workload has not changed but at least, she does not bring work at home anymore. Even if she was paid for supplementary hours, even done at home, she wanted to do something else of her life, not to dedicate all her time to her job. She had always wanted to do something creative and now, follows fashion design training.

CDB is divorced; she left her husband because he was present "without being there", always in front of his computer, only stopping to have meals. She has three children (7 to 11 years old) and a new boyfriend. She works around 50 hours a week but had to take a part time because she needed her Wednesdays afternoons off to take care of one of her children who suffered from health problems. She was forced to agree a wage decreasing, despite her timetable; her management would not allow this flexibility without part time. She qualifies her part-time as "social part-time". She works 10 hours a day without compensation; she really likes her job and puts a lot in her work without counting; she often works at night at home. Her boyfriend works in the same company but in another department; he never comes back before 8 pm. He usually works at night and one day of the weekend. She likes her job but confesses that her job cannot be a passion; a man can make a passion of his job, but a woman cannot, she has no choice.

KVA works part-time (4/5) in order to organise her working time taking into account that she has to pick up her child at school. She says that this has no effect on her workload but this allows her to stop earlier a few days a week. She brings work at home. She sometimes teleworks but on an informal basis.

In CS's department, there are around 30% of women; 10% of them are working part-time for their children. They need to be at home Wednesdays afternoon. Nevertheless these women are still working 9 hours a day.

- Only one woman hardly refuses this working model, but she seems to better protect her colleagues from overtime than herself.

MF did not take on her professional milieu's standard profile: too busy worker, unable to control his/her working hours and to be far from his/her computer. She is clear-minded and aware of her professional context's aberrations, in particular as far as time is concerned: staying late at night, catching people when they are leaving and keeping them for half an hour more, etc. Some use to stay until 8 pm every day, but finally, their job is not achieved before those of the others'. She insists so that a colleague, mother of twins, leaves at the supposed hours (5 pm). Blurred rules concerning holidays makes her management smile when she requests clarifications. She does not agree to conform her timetable on the one who works the longest hours and she does not like to be obliged to negotiate to get some financial return. For her, it is a perpetual begging. MF thinks that as regards working time there are many mutual influences. If one stays long hours the others do not dare to do shorter hours. She thinks that there is some mystification. Some stay at the office until 20pm but the job is not done. She prefers somebody who stays 8 hours and who really works 8 hours.

- The client is often an alibi; there is a widespread feeling that the pressure comes from the client and not from the organisation.

NG explains that they are all working long hours. They feel responsible for the client. They are all very big clients and when they contact the support service it is for problems that often represent considerable costs and problems for the clients so they think that they must be available. Their support service is organised with other subsidiaries in Australia and United states in order to provide a service 24 hours a day. They also work the weekend from 8 o'clock to 14 o'clock. She said that they are all interested by the weekend shifts because it is well paid. The average age of the 300 members of her company is 27 years old, 3/4 are strangers. There is a high turnover.

For FG, part-time is impossible in these professions. The client must feel that you are totally available.

Many believe that part-time is not possible when you are an interface between the client and the developers. You must be available the whole week.

3.4 Pay and reward systems

- Wage individual negotiation is common in the IT sector. There are few rules as regards pay and reward systems and manager's good will can replace reference rules in the individual negotiation on wages or careers. Women are often less successful in such negotiation, sometimes because they underestimate themselves. The biggest problem in this field is to be sure that there is some equality between men and women; nobody is sure of that.

> *PD-man In the firm X, the rule is: if you want an higher wage, you live the firm and you come back six months or one year after. There are competent people who came back two or three times. It was the only way to have an higher salary.*

LNG thinks that she did not well negotiate her salary and advantages. She sees women as less successful in this field. They underestimate themselves.

> *LNG At the hiring, one should better try to get the most; I did not do this because I did not know. For example, I saw people being taken on after me, with less professional experience, who succeeded in getting a car from the start! Whereas I had more experience, I had many skills but I think that as a woman, I*

underestimated my value and I think that this is a lot of women's case! So, it is better to negotiate as high as possible, and if the firm says" no, we do not have the financial means" at least you will have tried, but you have to try from the start. Men, at least, took the risk to ask for a car and a mobile phone, and got them.

AL's manager is a woman who works around 10 to 12 hours a day; she has been manager for 2 years now. She recently decided to raise AL's wage because she noticed that she earned much less than colleagues who had the same job. Wage and extra have to be negotiated, there are not any pre-determined scales or evolution; wage raise is up to the one who negotiates best. She now believes that she has been too modest when she negotiated her wage.

KVA is not really happy with her salary that has not changed for 7 years.

MF does not like to continuously have to negotiate to get some financial return. For her, it is a perpetual begging.

MF A wage rise? Never!! Except if you go and cry. In the private sector, you have to beg to get anything. That is how it is, and this is what frustrates me the most. First, I hate to have to ask, when I believe that one has be recognised for his efforts and the work done is easy to assess because it is there! Because what I am the most angry against, is that I can not stand that the reward does not come from the employer who could say "you deserve it". If you do not go yourself and say "I believe that I deserve something" nobody will come to tell you that he is happy with your job and will give you this. That is what deceives me the most in my job.

CS's hierarchy is still male dominated. Going abroad becomes an obligation and does not give rights to specific rewards.

NC does not receive a high salary as regards to her competencies and working hours. Her problem is the recognition of continued education in term of money.

3.5 Informants' evaluation of their situation

- Informants' evaluation of their situation is made of diverse impressions:
  - First of all, most of our informants really like their job; some of them are passionate. What women like is the diversity offered by their job and also the possibility to make someone's dream concrete, to be able to translate someone's need in a helpful software.
  - Working atmosphere, despite the majority of men, is not a problem for women who feel well integrated and who describe good relations with colleagues and managers.
  - Women are not distressed by their job. They all recognise that their workload is too heavy and complain about the deadlines, the working hours, but they are able to cope with that very well.
  - However, we also find choices, renouncement and regrets both on the professional and the private levels.
  - Some women are confronted to the glass ceiling.
  - Finally, three of our female informants (and one man) do not want to do a whole career in IT professions.

AL is really happy in her job but she wants to keep some room for other interests in her life. She thinks that work is not sufficient for personal development and a well-balanced life. She personally is active in cloth design.

NG is happy; colleagues and manager are all friends. At this time, she does not have any particular projects for the future. She is married but does not have any child yet. She does not have many external constraints and works a lot.

NC knows that she could earn more somewhere else (her wage is really low) but she likes her current job. She does not think about her future in the long run. People believed in her competences at work, while her family doubted; at this stage, she feels happy in her job.

MF regrets to have sacrificed a part of her private life for her job; she worked a lot at that time, having to travel to Paris and Brussels, and she had no choice. However, she gets on very well with her 14 years old daughter and advices her not to make the same mistake and instead, to choose a job in which she will not have to leave her family for the sake of her career. She thinks that she has missed many things as regards children. Her husband was of great support even if at the beginning, he did not appreciate that she earned a higher wage. She comes from a blue-collar milieu, and her husband works in a steel industry. MF does not regret her job, what she regrets is all the efforts that it requires to make a career, and mainly to renounce to having other children.

> *MF I often chat with my daughter about the job that she would like to do and I always tell her not to do a job in which she will make a career and have to put a lot, because she will have to leave her children for her career and to make choices if she wants to succeed. Because it must be said that one cannot reach a job at this level without investment. My daughter is 14 years old and when I look behind, I realise that I have neglected my family a lot to reach that level. Without this, I would not be here. It is a choice that must be done, and I think it is harder for a woman.*

MF really likes the work she has done but she is not sure that it was the best choice. Things evolve too quickly in this sector. It is hard to follow the rhythm. She does not want to do a complete career in this sector; it is too stressful. She will probably stop and find another job around 45 years old.

> *MF Indeed, I am happy to have done it but if I had to do it again, knowing what I know, I do not think that I would. Because everything evolves so quickly that one is always lagging behind! That is what is hard.*

MF notices the problem of the whole team's dependence to the project manager. Some years ago, she lived a severe car crash and even in hospital, colleagues and director came to ask her to solve problems. This led her to foster knowledge sharing within her team.

CDB works for a computer service company that has existed for 25 years; it counts 85 workers but is organised in small departments (each of them is an independent company) sheltered under the same roof. There is not any human resource management service, but a "rigid and deaf" management, rather indifferent to claims and family constraints. She is director of the training department that counts around 10 salaried and 5 freelances; she created this department. In her job, she states and feels a different attitude towards women. They recently created an informal board of directors including the General Manager and all the Department Managers … only two department managers are not present: the two managed by women. The General Manager has decided to represent them. He takes the decisions without dialogue or communication with the two women.

4. The private situation

- Among our 15 female informants we have:
  - Six single women without children and five married women, one without child and four with one child. Among the seven women who have no child, four are aged between 25 and 30 years old, and three are aged between 35 and 40 years old. Some of them have very few interests outside work.

- All our informants that have more than one child are divorced: we have four divorced women, one with two children, and three with 3 children. These women explain that at home they are also project manager. They have to organise the coordination of family needs and professional constraints. They organise their working week with other parents, some days with the father, some days with domestic help.

- Our women consultants, asked to regularly travel abroad, do not have children, did not have children or have decided not to have children. Some regret it.

KI Children? This is not possible; this is not possible at all!

- Only some of them have leisure outside work. Unlike men, their leisure is few often linked to computers. AL follows clothing design courses; KVA is a member of a professional organisation and of parent's association, she participates in events organised by her daughter's school. Others clearly say that they do not have any leisure, that work takes all their time.

- Family help? The distribution of tasks among men and women is still unequal. Men participation to domestic duties is still considered as too limited. One informant noticed that if equality went slowly through professional world, it was even worse as far as domestic duties were concerned.

CDB is divorced with 3 children. She has a part-time (4/5) but works 10 hours a day without compensation. She really likes her job and puts a lot in her work without counting. She often works at night at home. Her boyfriend works in the same company but in another department; he never comes back before 8 pm. He usually works at night and one day of the weekend. She likes her job but confesses that it cannot be a passion; a man can make a passion of his job, but a woman cannot, she has no choice.

CDB I have a "Marie Poppins".... in the morning, I drive them to school before coming here, then at 3.30, a nanny fetches them and takes care of them until I am back. My companion's timetable is worst: he is never back before 7.30 or 8pm, he is nearly always connected and works nearly every evening; one day a weekend is devoted to his job. Women's world is not the same as men's.

KVA explains that at home, she is also project manager. She is member of a parents' association that takes care of all members' children. So each day, a family is responsible for the other families' children. This allows everybody to work longer days.

MF is married with one child; her husband works in a steel industry. Her husband and parents help her. She regrets to have sacrificed a part of her life to her job. She would have preferred to have more than one child.

NC is divorced with 3 children. She is responsible for her children and their father takes them only one every two Fridays. These Fridays, she can work later. She does not feel it hard to manage her timetable. She benefits from reciprocal flexibility: on the one hand, she works too many hours but on the other hand, she can freely organise her working time for her children. It took some times to find this equilibrium because she used to work too much when she was engaged, but now, she has found a balance.

CS has nothing outside work. She goes back some weekend by her parents. She has no leisure. She has a boyfriend, they have separate flats. She does not have any child but regrets it, but now she is 40 years old. Her boyfriend is a computer scientist divorced with children.

BN has two grown-up children who do not live at home anymore. She is divorced and has a boyfriend who does not live with her. All her time is devoted to work.

AL has been a young mother (16 years old). She is married now (not with her child's father). Her husband studied law a university. She is consultant but has interest outside work (cloth design), that is why she chose a part-time (4/5).

When she engaged herself in adult training, her boyfriend supported MV. It was important for her. He works in electronics and is passionate by PC.

5. Work culture

5.1 General trends

- In a culture of long working hours and of total availability, workers are considered as goods; they must be "100% billable", particularly consultants. FG, but also KI , BN and others, think that women consultants cannot have children. In fact, consultants are considered as goods –well paid good– so they must be, at least, 100% billable. FG replaces a woman consultant who is pregnant. The manager was really upset when he became aware of that. They were on the verge of asking FG to sign a document engaging her not to be pregnant during the project.

- Making choices in the name women is frequent in these professions, and probably in others. Managers take decisions for women without asking for their preferences. Most managers eliminate from promotions all women who have children thinking that they would not be interested.

  AD-man (manager) I am a bit under the impression that they do not always want to make a career. I am not stopping them in their career development at all but I think that women, at a given time, and this is very natural, have different priorities than their career development. We must respect this choice, that is all.

- The working relations are characterised by a mix of collaboration and competition. Competition is mainly seen as a male attitude.

AL said that in IT professions, people feel in competition with each other, but she adds that it is mainly a male attitude, in which jealousies between men about wages, cars and PC are important.

AL I am under the impression that it is a milieu where people feel that they are competing with each other. What make me think this are my colleagues' reactions to each other… we (women) are often astonished by their reactions as regards to wage, cars and PC. There is a lot of jealousy.

- Having fun in work is important. One of our male informants pointed out that this had always been an important factor in his trajectory. One of our female informants also pointed it out.

PD-man I am not someone whose perspective is to become a big firm's big boss and so on! I describe my self as someone, sorry for the expression, who tries to have fun in his job!

In NG firm, the average age is 26/27 years old. Her team is nicknamed "baby team", the one where the youngest begin. She is in her job as in a continued childhood; she still has a child attitude in the way she sees herself in the hierarchical relationships and in her professional environment. Words used in the firm are evident: colleagues "baby-sit" your project when you are away; resource colleagues are named "God"; they draw lots for week-end duties;

stock options' dramatic loss of value was subject to laughing; changing job towards more development means wanting to "play" with devices; colleagues are mates and so are managers, except in the relationship with clients; a professional mistake is qualified as "bullshit"; work distance control is named "spying". Play activities seem to have an important part in the work atmosphere. Workers relax by playing with darts guns and last extra-professional activities were going to a circus, to a leisure park or ice-skating.

- Commitment to the client is also something well rooted in the work culture. We notice a strong feeling of responsibility towards the client, but a kind of "protecting" attitude: "the client needs us and we cannot neglect him, he is dependent on our decisions, dependent on us." This commitment to the client seems to be the determinant factor in work organisation and working time, although the clients' requirements are sometimes an alibi. In the relation with the client, there is also the pleasure to realise "clients' dreams".

- Both for men and women, there is no interest in organised social relations. All adopt self-organisation and personal relation with hierarchy and trade unions are seen as inadequate to these professions and not useful. Individualisation of working and work relation is a common trend well accepted by IT professionals.

- Permanent changes and speed are also attributes of this specific work environment. This is something stressful for many informants, both men and women. A male informant compares his work to a high-speed train from which he would like to get out sometimes but it is not possible. He concludes, as some women, by saying that he will not do a complete career in this area, he doesn't want to die before 55 years old, he says.

  PD-man From time to time, one feels like going down from the high-speed train. Because it is so quick. I have always said that I would not do that all my life, I do not want to die at 55.

5.2 Relation to computer

- If we do find the expected merged relationship with computer, both for men and women, it only concerns a minority of informants. Some of them (more frequent among men) have one and only leisure: their PC. There is also a feeling of power associated with PC.

In NG, we found a kind of merged relationship with computers, not with a devotion to technology, but with some feeling of power. The stress to be "disconnected" for a while, like during the holidays or a maternity leave, is present and linked to the fear to be outdated by technological developments and to be out of information channels. ……The feeling of power in relation to the job is often present; indeed the firm administrates huge worldwide networks and, for example, the US Government is one of their clients. NG describes her firm like "a big monster that she holds in her hand"; financial amounts concerned with on line assistance are huge.

CDB describes her relationship to computers as a fusion; computers are part of her home, like TV and radio. Her children have early access to a computer. In her professional environment, she sees very different people but all of them passionate.

JMP-man came to computers on the job, beginning as a technician. What he likes is building, and especially the rapidity of computers, compared with electronics where many pieces need to be assembled before a result happens. Computing is his main and nearly only hobby, with going to restaurants and playing with his two grandchildren. Saturday mornings are devoted

to his job, knowledge updating, … Yet, despite the fact that he really loves computing, he believes that computer are only stupid tools not able to take any initiative and that no one must be afraid of them, on the opposite, one should master them because they are tools.

DS-man's only hobby is computing: he spends most of his free time in front of the computer doing copies, chatting or surfing. Already as an adolescent, he used to play video games but not on the Internet because he does not like playing with others. He does not dislike his job, he says, but the people he works with.

- Two men and a woman compare their work to the construction of a building.

JMP-man what is funny in computing is that you begin with nothing, you raise bricks and assemble bricks and in the end, you have something that works and functions, and that people use. It is not too bad! It is as if you were building a car… or a sitting-chair or anything, and then you say "well, let's sell it", and it is used by many people.

PD-man What I like is human relation, and, what I told you before, the fact that I build something. At my level, I a the architect, the bricklayer, the plasterer, I am also the one who will put the groundsheet, the tiled floor, I am the electrician and in the end, when everything is done and when people are in the house, I show them around and tell them where is everything and how it works. This is my job; this is what I find great!

- However, we do not find among our female informants a real interest for the computer as such. They are interested by what they can do with it. One of our informants explains the differences that she sees between men and women on this aspect. She compares their interest for PC to their interest for cars. Men will look at magazines, at the motors; compare the powers, etc. while women will not. She says that men are fond of PC magazines but women are not. They only have a look at what is absolutely necessary. One of our male informants had a funny expression. He explained how his colleague "was undressing and dressing again" the computers.

CS Men read everything; I have never bought a computer magazine. I hate that! It is the end of the world when I have to read one, so why would I buy any? It never crosses my mind. Men do this a lot but it is like car magazines, I do not think that any woman regularly buys any! While they go and see under the hood, we just look at the design and the colour!

- What is a common feature in the evaluation of the relation with computer for most of our informants is the human relation associated to it. The important in their work is to bring solutions to clients, to make their projects concrete, to explain things, to help them to reach a higher level of knowledge.

5.3 Gender issues

- Most of our female informants have been confronted to differences in attitudes and treatments between men and women despite a general discourse that deny these differences.

- A first thing that seems to be a female question is the need to make choices. This is a complex question. Putting this question like this supposes a tacit agreement on the incompatibility between a family life and a professional life and this also supposes that all the renouncement will be endorsed by women and that companies are not concerned by this choice. Nevertheless, if some women say that they had to make choices, not all of them have this attitude. Many women do not see this presupposed incompatibility between family and work. However, many managers often suppose that women have made

choices. If a woman has one or more children, she is supposed not to have career prospect anymore.

AL thinks that when you climb up the hierarchy, you have to make choices as regards your private life and accept many things.

CS, who does not have any child, says that women are afraid to have children, to disturb the development of a project. She feels favoured as regards other women because she does not have any child. She thinks that manager decide for women without asking for their preferences. They never propose promotions neither responsibility to mothers; they are supposed to have chosen not to make a career.

CDB The problem is that for men, their job is their passion, so they do not see the difference anymore between job, leisure and passion. I do not have any choice, I cannot make a passion of my job; a woman has to put limits to her passion.

BN Each one makes his choice and every women have choices to make, I am really aware that women have more choices to make than men: either thy do not have any child and have professional future already as young women; or they have children and will have to make sacrifices in a way or another. Do not hope that there will be other solutions.

AD-man (manager) I do not make any difference between a man and a woman. I think that, like their male counterparts, they can evolve in a firm. Yet, at a given time, a priority shows up: wedding, foundation of a family, children… Nature gave them attributes that we do not have. This must be respected because even with the best will in the world, it will not be changed. If the woman decides to have these priorities, I will respect her choice, but if she tells me that she will not get married before 80 years old, I treat her equally without it being a moral or legal obligation. It is natural.

- Gender problem is not at the level of men/women relationship, it expresses itself in different ways: doubts about women's abilities, negation of female authority, hard progression, lack of appreciation. The need to be supported by the direction to progress in a career is mentioned by some women. MF has the impression that being a man would have facilitated her career.

MF the more I go on, the more I think that had I been a man, I would have had more chance; I feel it.

NC explained that when she started her job she had to work with a computer scientist who was systematically sceptical. She cannot say if it was because she was a woman or because he suspected that she was not competent. He was not ready to take into account any professional remarks coming from her. It took some time to establish a good relation.

BN is responsible of a team of 12 developers. They are all young men. She describes them as "talented kids". She says that they do not want any female colleague.

LNG relates competition between men and women as regards working time. In her former firm, there were two female project managers and two males. The two men were doing many additional hours, even the weekend. Women had to ask them not to play such a game that put them out of competition. These men were not able to delegate. They were both young and single.

- Many women have been confronted to the clients' scepticism.

NC does not feel upset when, answering the phone, people think that she is the secretary, on the basis that she is a woman. She believes that things always finally end well. She did not get on well with one developer at the beginning: he gave her the impression that she was not able to understand what he explained. It took some time to implement trust; she still does not know

if it was because she was a woman or because of her lack of degree, or both, that motivated his attitude.

MF thinks that when she gives training or advices, men seem frustrated because it is a woman who has the solution.

In KI's firm, there are 50 male business consultants for two women and 1 female manager among 10. Within the firm she said that there are no problem between men and women but at the client it can be different. Some clients are more traditional (ex in industry) and do not accept women. In sectors like finance, it is more open. The only female manager is responsible for the financial branch. In some contexts as industrial firms, if a female consultant does not have the support of the hierarchy in the client firm, it will fail. She relates some cases were the female consultant had to be replaced by a male consultant only for gender reasons.

As technician, MV reports that many clients are sceptical when they see a woman arriving for assistance. They feel insecure but when they know her there is no problem anymore. However some men in her professional environment remain sceptical. "One of our supplier even do not look at me, he does not shake hand with me, as if I were a plant."

CDB is responsible of a training team. She is aware that attitude of client towards men and women are different. If she needs a trainer on acute technical subject, if it is a woman she cannot be young and she has to show directly that she is competent. She knows that for some clients she has to propose male trainers and not women.

For KVA the problem for women is the client. They do not always consider women as competent persons.

> *KVA The only problem about being a woman is at the client's, sometimes. We feel that we are less seriously taken into account than a man. For example, yesterday, I went to a technical firm for a tender to offer; and off course, there were only men, and there, you feel that you are not seriously taken into account.*

- The glass ceiling is still alive in IT professions; few women can reach high positions.

CDB notices and feels a different attitude towards women in her firm. They recently created an informal board of directors including the General Manager and all the Department Managers … only two department managers are not present: the two managed by women. The General Manager has decided to represent them. He takes the decisions without dialogue or communication with the two women. … She also feels that, straightaway, people trust women less than men in this sector. And if she has to engage a trainer, if it is a woman, she will have to be old enough to be accepted by the client. For training or counsel missions, some clients prefer a man, even if he is less competent than a woman.

For BN being responsible is not compatible with a part time. Management function requires more than a full time.

> *BN being manager requires time, more than a full time! One cannot be manager and work part-time.*

- From men's point of view, equality often means being considered as … a man.

JMP-man qualifies the women he knows in the field of "men".

> *JMP-man We once had a woman colleague, but she had a man's character, it was really… She acted like a man "hello!» she had a male way of living, indeed she was single, really like a man, in the way she dressed, everything…*

AD-man (manager) The glass ceiling … I can't see … and it crosses my mind that I happened to work for a woman who was my manager and everything went well. I also had female counterparts, with whom I discussed equal-to-equal, in a hotel bar, drinking whisky and discussing problems without any difference… any…

CDB Let us says that we were under the impression that we were men… When you are pregnant, but carrying heavy machines, and people look at you saying "you should not carry this, it is bad for you", but nobody helps you… you say well, with men, we act like men! Now, I assume that it is the same anywhere else… we are considered as men.

- Very often, family constraints remain considered as women's problem. If there is a problem at home, the professional agenda of the father will always be considered as more important than the mother's one, even if they are doing the same job. As a woman without children, CS states her admiration for those mothers who are working so hard. She thinks that personally, she would not be able. Other women without child express their admiration for those women who can have a family and work in such a professional environment.

KI I do admire women who can have a family and work in a society like this one; because it is not easy.

CDB's director is 50 years old. He uses "tu" form for men and "vous" form for women. He thinks that women have nothing to do in a direction committee.

- Stereotypes and sexism are still present, particularly in men's mind.

PD-man In computing world, I should not says that and you should not record it, but one say that women are very ugly.

AD-man (manager) I think that computing world is still a macho one.

PD-man … "La bonne femme", that is how we call Ula between us (Ula is their female manager).

6. Further learning and progression

- Further learning is essential in IT professions; it is not possible to remain in these professions without a continuous adaptation of knowledge. Different situations are encountered. The less problematic is the one of some informants who have training opportunities in their firm. For them, further training does not constitute a problem, it is organised and paid by the firm. It is mainly the case for those who are working in large companies. It seems to be the case for the youngest women. There are only some difficulties for those who are working at the client and seem to have less access to this training offer because, as consultants, they have to be billable all the time.

- Other firms do not offer structured training anymore. Nowadays, everything is organised through e-learning. However many women have doubts about e-learning's efficiency.

KI says that, some years ago, there was a wide training offer from the firm, but nowadays, the learning strategy is completely turned to e-learning. However, she does not find e-learning very efficient.

KI Do you think that e-learning is efficient? No, not really. Not as far as I am concerned. I learn much more in classrooms where there is someone who explains, where we can discuss and have exercises, rather than e-learning where one stays in front of his computer and there is not a lot of interaction, except questions in the end to check if we understood everything.

- Many informants explain that they do not have time anymore for training, even if there are opportunities in their firm. So they only rely on self-training, but it shows its limits.

MF has no more time for training, she learns by doing and with the Internet.

CDB is always learning new products, through self-training.

> *CDB Really, to go on being manager of a training department, one has to know what he is speaking about! If I am not aware of new trainings that will come on the market soon, of new products. I have to be one year in advance compared to what is already on the market.*

LNG explains that there are not any training offers from her firm, only self-training, with its limits.

> *LNG We want to know the products, but they do not give us the needed means. For example, they hardly send us to trainings, so we have to try to learn by ourselves, but we never know if what we have discovered is correct. For example, I had learned on the job about one product, and when I met the publisher of this product, I noticed that I had huge gaps in my knowledge of the product. So I believe that only betting on self-training is not sufficient, some basic training is needed, and we lacked that in my firm, we could feel it. Workers often asked for trainings, at least at the publisher's, only a basic one, to be sure to have the right basis to build upon.*

KVA says that she does not receive any training opportunities from her company. This is a small company (around 35 person's) that is always presented by her manager as a start-up, with the promise of a better future.

- Some informants also notice weariness as to regards this perpetual training effort. When you learn new things, you do more things; this contributes to increase you workload, and puts you in a vicious circle.

CS says that she is tired of this perpetual training. She is not sure that she wants to continue to climb the hierarchy; she thinks about going towards managing function.

PD-man learns all the time, through new projects and by personal readings after work, by informal knowledge transmission with colleagues but he says that it is very hard to always be up to date and that he will not do it all life long.

- They are all aware, both men and women, of the risk of not keeping his knowledge up to date.

DS-man has not kept his knowledge up to date and has only been coding in C++, this is the only language he knows very well. He would not dare speaking about what he learnt during his studies 3 years ago because he has forgotten a lot and it is outdated anyway. So he has not been learning any new stuff for two years in his job, never received any training except in languages. He does not feel like studying outside working hours and does not have any free time for that. He would never dare taking some time at work to study, search the web or read a book, although he has never asked.

- Both for men and women, jobs changes are mainly determined by the wish to continue to develop competences and to learn new things. However, women with children are less mobile than those who have no child.

Afraid by her working rhythm, CS explains that it is also difficult to stop climbing up the hierarchy. If you want a less stressful job, with less working hours, people will not take you on if you are coming from a higher position.

- Progression and career follow simple rules: availability, mobility, and long working hours. Before adding the gender aspects, women who have a family encounter more difficulties than men. CS thinks that if she compares herself to female colleagues, she has been favoured because she has no child.

- Some women and one men explained that they would probably stop to work in IT professions

FG says that she will probably work around 20 years as a computer engineer but afterwards, she will find a less stressful job, perhaps teaching. She is not really sure but at the moment she does not have the project to make a whole career in this sector.

Part 2: Women's profiles, drawing out some patterns

In this second part of the document, we have selected 5 women's profiles that can constitue a kind of typology of women trajectories in IT professions. Each of these profiles is illustrated by a short biography.

- *The linear flow: adolescence that goes on at work.*
  The first one concerns young women, trained in the 90's, still without family constraints. These are women who have linear curricula, without detours. They were good at school and have benefited from a supportive family. They have university degree. They are still engaged in job in which the technical part is important. Most of them where familiar with PC before starting their studies in computer science. Most of them have boyfriend or husband, but no child. They have little interest outside work. They work a lot. They are looking for jobs in which they can still learn things but also that are not boring. Friendliness and fun in work relations is also seen as important. At this stage of their career, they see no obstacles to their future career, even if they do not have clear ideas on what can be their career. They have no critical eye on their work environment. Their trajectory is a linear flow without detours or turning points and their professional life looks like adolescence that goes on at work. They often work in firm where the average age of the workforce is under 30 years old.

- *With will and resentful lucidity: not sure to have made the good choice.*
  The second profile concerns women who have started their career in the 80's. These are woman who have chosen an orientation that was not frequent for women at this time. They were good at school and had no problem with the male dominated classroom. They started their curricula without any familiarisation with PC but this was not a problem. They had to fight to gain a place in this area of activity. They have worked a lot, and are still working a lot. They are clever and courageous women. They have high position and a critical eye on their career and their work environment. They do not want to climb the hierarchy anymore. They even plan to stop to work in IT in some years. They had to sacrifice a part of their private life for their career. Even if they still like their work, they are not sure to have made the good choice. The price to pay was probably too high. These women have also a linear trajectory but ridded with many obstacles and efforts. They are not very sensitive to collective organisation. They see them as inappropriate to their activities.

- *Want to have a career but glass ceiling and few room for family life.*
  The third profile concerns women who came to informatics through reorientation after a first university degree. They were good at school. They are women who had other career plans at the beginning of the working life but for personal reasons (children, going abroad with husband, …), they stopped their career and started, after an interruption, a new

curricula in computer science. They were not familiar with PC but it was not a problem. They are dynamic women, who have tried to achieve a brilliant career in IT professions but who are blocked by different obstacles: they have large families, they are often divorced, and they work in firm where sexism is well alive. They are passionate by their job. What can characterised these women is their high investment in work, they work a lot, they do all what is possible to develop their job by they have few recognition from their male hierarchy. They are not in situation in which they can consider that mobility can be a solution. So, they continue to invest a lot in work but with no more perspective in their career, even if they are around 40 years old. They concentrate on their working group. In their family life, they are also project manager. Their trajectories are not linear but have been successful until they riched the glass ceiling. There is no room for family constraints in their working environment. These women are individualistic even if they paid attention to their team's working conditions.

- *Being independent: starting a new life.*
  The fourth profile is the one of women who have professional chaotic trajectories and who have started a new life taking IT profession as a reorientation. These women were not good at school. They have started several studies without any success, taking very diverse orientations. At this time, they had no professional project. They have worked, in many small jobs, and have build a family quite young. They were dependant women. Tired of the low qualified jobs they had, these women decided to start something new, to be independent, and to show that they are competent persons. They looked for a new orientation, not specifically in IT. They are open to many possibilities and have no specific idea or experience with computer. It can be the hazard that lead her to IT training. They look for adult education because they to do not have a good experience with initial training. Once decided, they invest a lot in their training. They are really passionate and work a lot. At the beginning, they are supported by their husband. However, this important change in the woman attitude and this strong desire of self development is not always well accepted and can lead to tensions with the surrounding. Once these women have a job, they invest a lot in their job. It is like a new birth in the professional life, with all the perspectives that it opens for the future.

- *Self-determined: a job that she likes, but the will to control her life.*
  This last category concerns women, very competent, that have chosen IT curricula not because they were passionate by computer but because they were looking for a secure and well remunerated job. These women were good at school. Being or not familiarised with PC before starting their studies in computer science is not determinant. They are not very dependant on external support; they have strong characters and a high determination. They have good career, still open but they do not want to invest all their time in work. They don't think that this can lead to a well balanced live. They have a clear-minded view on their sector, and on the gender differences in their work environment. They have other interests outside work.

1. The linear flow: adolescence that goes on at work

– Young women, married without child.

– Engineer, works in a large company providing customer support in network management (worldwide networks).

- Early interest for computer.
- Family support.
- Biographical continuity without any particular event.
- Interest for her job and sense of responsibility towards the customers.
- No particular professional project.
- Immature disinterest form her environment, somewhat kept alive by the firm.

NG is 27 years old and is married. She chooses to be a computer engineer. She has always felt interested by math and sciences, do-it-yourself, all which is linked to sciences. Her father liked DIY and she used too (building models, radio controlled cars, etc.). Her parents had neither technical nor scientific job; her father was a translator and her mother a marketing woman. Her brother also chose computer studies. She early benefited from a computer at home, while she was in primary school, thanks to her mother's job. She spent a lot of time in front of the computer; teenager, her leisure was mostly DIY and computing.

She opted for electronic studies; her parents agreed but asked her to do it at university level, so she did engineering studies. Her professor of electronics (a woman) put her off from electronics (too theoretical for her). She applied for a job in a firm that she had visited during her last year of studies (an international company specialised in network administration that employs 300 people in Belgium). She had got the job before getting her degree, the contract logically including a degree clause. Her firm is a provider of worldwide network systems. She had 10 weeks training before starting the job but she thinks that the reality is even different and she had to learn by doing. She explains that it was quite hard at the beginning.

In her firm, the average age is 26/27 years old. Her team is nicknamed "baby team", the one where the youngest begin. She is in her job as in a continued adolescence; she still has a adolescence attitude in the way she see herself in the hierarchical relationships and in her professional environment. Words used in the firm are evident: colleagues "baby-sit" your project when you are away; resource colleagues are named "God"; they draw lots for week-end duties; stock options dramatic loss of value was subject to laughing; changing job towards more development means wanting to "play" with devices; colleagues are mates and so are managers, except in the relationship with clients; a professional mistake is qualified as "bullshit"; work distance control is named "spying". Play activities seem to have an important part in the work atmosphere. Workers relax by playing with darts guns and last extra-professional activities were going to a circus, to a leisure park or ice-skating. We also noticed a strong feeling of responsibility toward the client, but within a "protecting" attitude: "the client needs us and we cannot neglect him, he is dependent on our decisions, dependent on us."

In NG, we found a kind of merged relationship with computers, not with a devotion to technology, but with some feeling of power. The stress to be "disconnected" for a while, like during the holidays or a maternity leave, is present and linked to the fear to be outdated by technological developments and to be out of information channels.

NG does not control her working hours; it is as if "a little voice whispered to stay after 5 pm". Only weekend supplementary hours are paid. His husband used to complain because she

usually did not come back before 8 pm, so she tries to finish earlier. He is industrial designer and in his job, supplementary hours are all taken into account and, by consequence, better controlled.

The feeling of power in relation to the job is often present; indeed the firm administrates huge worldwide network and, for example, the American Government is one of their clients. NG describes her firms like "a big monster that she holds in her hand"; financial amounts concerned with on line assistance are huge.

The firm atmosphere describe by NG is something like "living outside real world". Most communications are virtual, except with nearby colleagues. She does not question things, they are as they are; she is happy, and believes that so are her colleagues, and so turns the world. There are not any unions in the firms, social elections have been organised but NG thinks that nobody has voted. Self-organisation seems to be enough.

Further training does not constitute a problem, it is organised and paid by the firm. NG does not have any particular professional project, she feels good in her firm and in her job.

2. With will and resentful lucidity: not sure to have made the good choice

- Married women with one child.
- Computer specialist, responsible for informatics for two newspaper groups.
- Coming from a background where traditional gender roles are clear-cut and boys are more valued than girls.
- Choice of computer studies by accident, without prior familiarization.
- Husband's support.
- Lack of self-esteem.
- Regrets to have sacrificed a part of her family life for her job and advices her daughter not to choose a job where she will have to make these hard choices.
- Critical eye on work organisation in the sector, especially as far as time is concerned.
- Likes her job but does not look forward for a complete career in informatics.

MF is 38 years old; she became computer specialist "by accident". Today, she manages one computer service that works for two big press groups. She chose computer studies by eliminating other choices and because she liked mathematics and logic but she did not feel able to be a teacher. She had never touched a computer before beginning her computer studies. She had to choose a 3 years non-university course because her brother was also studying and it was too expensive; one had to stop, it had to be herself. Her brother became engineer.

Her family can be described as very traditional as regard to gendered roles; today, after a 20 years long career, it is still her brother's career as an engineer that makes his father proud, not hers. She can be manager of a computer service, it is good but not important.

When MF began her professional life, she was not self-assured and still today, she finds it hard to take over her manager role and prefers dialogue to authority. At first, she did not arrive to "sell" herself as a computer specialist and worked as an administrative worker for a daily newspaper. It is when a computer specialist left the group that, knowing her degree, she was offered his job. Her self-esteem grew from then on and, finally, she replaced an older computer specialist who had left, she became team manager. She followed some additional training in specific languages. Now, she is responsible for informatics for two newspaper groups. Her unit has been externalised as an independent business unit. MF is responsible of a team of three persons, mainly male developers. One of then had applied for her job, now he refuses to be supervised by her. She makes the pre-technical functional analysis related to the management of two newspaper groups, all what regards accounting, subscriptions, sales, etc. She is passionate by her job, what she really likes, it is not developing but analysis, "realising client's dreams".

She did not encounter any difficulties in men/women relationship during her studies; this aspect began to be felt at the professional level only. It expresses itself in different ways: doubts about women's abilities, negation of female authority, hard progression, lack of appreciation.

She did not take on her professional milieu's standard profile: too busy worker, unable to control his/her working hours and to be far from his/her computer. She is clear-minded and aware of her professional context's aberrations, in particular as far as time is concerned: staying late at night, catching people when they are leaving and keeping them for half an hour more, etc. Some use to stay until 8 pm every day, but finally, their job is not achieved before those of the others'. She insists so that a woman colleague, mother of twins, leaves at the supposed hours (5 pm). Blur surrounding holidays makes her management smile when she requests clarifications. She does not agree to conform her timetable on the one who works the longest hours and she does not like to have always to negotiate to get some financial return. For her, it is a perpetual begging.

She regrets to have sacrificed a part of her private life for her job, she worked a lot at that time, having to travel to Paris and Brussels, and she had no choice. However, she gets on very well with her 14 years old daughter and advices her not to make the same mistake and instead, to choose a job in which she will not have to leave her family for the sake of her career. Her husband was of great support even if at the beginning, he did not appreciate that she earns a higher wage. She comes from a blue-collar milieu, and her husband is blue-collar in a steel industry.

She does not intend to work in computing until she retires, maybe until 45 years old. The job is too stressful and working part time in her job is impossible.

3. Want to have a career but glass ceiling and few room for family life

- Divorced, with 3 children, 39 years old.
- Director of an IT training department.
- Scientific superior studies and reorientation toward informatics.
- Not any prior familiarisation with computers.
- Passionate by her job (but a woman has to limit her passion).

- Left her first husband because he was always in front of his computer, her new boyfriend seems to have the same profile.
- Merge relationship with computer.
- Confronted to non-recognition of out-of-work constraints.

CDB chose scientific studies, at secondary and superior level; she made a chemistry degree and finished her dissertation in the United States. She had planned to work in the nuclear field but this milieu was too closed to women. Her studies oriented her towards genetic research, but once again, young women are supplanted from these laboratories because of pregnancy risks and she was then given uninteresting jobs. So she came to computers, because her grandmother, with whom she lived, had seen and advertisement about computer studies and suggested her to choose this way. She did not feel attracted by computer and only knew rudiments. Thought, she decided to make informatics university studies without any difficulties. Around a third of the students were women, she firstly worked for the university and then in the firm where she is now.

She works for a computer service company that exists for 25 years; it counts 85 workers but is organised in small departments (each of them is an independent company) sheltered under the same roof. There is not any human resource management service, but a "rigid and deaf" management, rather indifferent to claims and family constraints. She is director of the training department that counts around 10 salaried and 5 freelances; she created this department.

CDB is divorced; she left her husband because he was present "without being there", always in front of his computer, only stopping to have meals. She has three children (7 to 11 years old) and a new boyfriend. She works around 50 hours a week but had to take a part time because she needed her Wednesdays afternoons off to take care of one of her children who suffered from health problems. She was forced to agree a wage decreasing, despite her timetable; her management would not allow this flexibility without part time. She qualifies her part-time as "social part-time".

She works 10 hours a day without compensation; she really likes her job and puts a lot in her work without counting; she often works at night at home. Her boyfriend works in the same company but in another department; he never comes back before 8 pm. He usually works at night and one day of the weekend. She likes her job but confess that it cannot be a passion, like a man could do, she has no choice.

She describes her relationship to computers as a merge; computers are part of her home, like TV and radio. Her children have early access to a computer. In her professional environment, she sees very different people but all of them passionate.

In her job, she states and feels a different attitude towards women. They recently created an informal board of directors including the General Manager and all the Department Managers … only two department managers are not present: the two managed by women. The General Manager has decided to represent them. He takes the decisions without dialogue or communication with the two women.

She also feels that, straightaway, people trust women less than men in this sector. And if she has to engage a trainer, if it is a woman, she will have to be old enough to be accepted by the client. For training or counsel missions, some clients prefer a man, even if he is less competent than a woman.

4. Being independent: starting a new life

- Divorced women, with three children , 31 years old
- Web designer.
- Chaotic professional track: no degree, interruption of studies, and interruption of work for 3 years for the children.
- Reorientation towards computing thanks to adult education.
- Not any prior familiarization with computers.
- Not any family support (even a divorce at the end of her training).
- Her reorientation is a bend in her life: independence, claim to exist for herself.
- She likes her job, puts a lot in her work but manages to find compromise for her family life.
- Does not have any professional project on the long run. Now, she "delights" her success after this difficult stage in her life.

NC is 31 years old. She finished her secondary school and tried one year of medicine studies without finishing, afterwards she began a training in tourism, without ending it either. She stopped her studies and decided to work, but was only recruited for non qualified jobs like receptionist-telephonist and security agent, then she stayed for three years at home to take care of the children, aged from 2 to 7.

She felt that she was able to take more interesting jobs than the ones she had known but could not find anything without a degree. That is what encouraged her to start a new training. At first, she was interested in clerical work, something that would allow her to take a new start. By accident, she assisted to a web designer information session, in an adult training centre and it deeply interested her. She did not know anything about computers and even rather had a negative vision of them: something non-human, very technical. Today, she has changed her mind.

She did not receive many family or friendly support; they did not accept to see her stand on her own two feet and decide to live for her. Her husband did not agree and they divorced. At the beginning, he was happy that she could participate to this training, he thought that it would be interesting for her but had not realised that a job would follow the training … into which she would put all her heart. He had a small job in mind, maybe a part time, just to have a secondary income. When she began to live more independently, he could not tolerate it and hoped that, because she was pregnant, she would not be recruited at the end of her traineeship but she was. He denied her abilities and argued that she must have seduced her manager. Even her friends and family did not believe in her and could not realise that she would be hired for something else than serving coffee and answering the phone.

NC is web designer; her training is equivalent to three years of non-university school but is not accompanied by any diploma, which leads to certification problems on the labour market. It allows having interesting job… but not the associated wage.

NC works in a small web services company, the firm where she made her traineeship. The firm is very young and requires much involvement and polyvalence from its workers. She believes that in a small firm, people have to work twice more, but she likes it because she is still learning things. She does not care if the supplementary hours are not taken into account; she considers them as an opportunity to develop her competences.

She is responsible for her children and their father takes them only one every two Fridays. These Fridays, she can work later. She does not feel it hard to manage her timetable. She benefits from reciprocal flexibility: on the one hand, she works too many hours but on the other hand, she can freely organise her working time for her children. It took some times to find this equilibrium because she used to work too much when she was engaged, but now, she has found a balance.

Work atmosphere is really good and friendly. People are organised around projects, each one's competences are complementary.

She does not feel upset when, answering the phone, people think that she is the secretary, on the basis that she is a woman. She believes that things always finally end well. She did not get on well with one developer at the beginning: he gave her the impression that she was not able to understand what he explained. It took some times to increase trust; she still does not know if it was because she was a woman or her lack of degree, or both, that motivate his attitude.

She knows that she could earn more somewhere else (her wage is really low) but she likes her current job. She does not think about her future in the long run. People believed in her competences at work, while her family doubted; at this stage, she feels happy in her job.

5. Self-determined: a job that she likes, but the will to control her life.

- Married, one children, 33 years old.
- Business consultant.
- She chose computer in the aim to quickly find a job.
- Strong personal constraint that conditioned orientation (young single mother).
- Not any prior initiation to computers, nor special mathematic or science interest.
- Family support.
- Puts all her heart into her job but chose to keep room for other interests.
- Clear-minded view on her sector and men attitude with their computer.
- No specific career project.

AL is 33 years old. She works in a company that counts around 500 people in Belgium; it is specialised in network technology and application development. As far as her studies are concerned, she studied two years of analyst, then decided on for a degree in library administration and an information administration degree (post-graduate level). Her job consists of the design of solutions, but not implementation; she considers that 50% of her job is not technical. Her role is to be the interface between the client and the developer.

She chose informatics by eliminating other choices, after an inventory of what she did not want to do. Yet, she wanted a degree that would guarantee a quick job, because she had a child. In another circumstance, she would have chosen something else. She soon realised that she had made a wrong choice but because she was determined, she went on until she could get a degree, which made two years, then she looked for a reorientation without losing her two first years. "Spending hours writing codes to make something a quarter of a second faster" did not appeal to her.

During her first computer year, there were around 100 students, including 6 girls. The 94 boys were only interested in computer, "computer, computer". She got tired of it; one of her female friend who was doing the same studies also opted for another orientation (marketing).

Before entering university, she had never touched a computer in her whole life. Being a young mother (16 years old), she was supported by her family. In her family, there were 5 children all destined to embrace university studies; her father also studied at university (linguistics), while her mother stayed at home. All her family has literary degrees; she is the only one to have chosen another orientation. She grew up in Spain.

Her firm counts around 40 analysts, among which there are 4 women (including herself) and one young woman manager (35 years old). Developers and engineers are all men. Amongst the 4 women, 3 work part time (4/5), always a choice as regards the children, except for AL whose son is 17 years old. She does not know any man working part time. She did not have to fight to obtain her part time, only to say if it was temporary of definitive. Before taking this part time, she used to work 10 hours a day and often at weekends.

Since she reduced her working time, her workload has not changed but at least, she does not bring work at home anymore. Even if she was paid for supplementary hours, even done at home, she wanted to do something else of her life, not to dedicate all her time to her job. She had always wanted to do something creative and now, follows fashion design training.

Her manager is a woman who works around 10 to 12 hours a day; she has been manager for 2 years now. She recently decided to raise AL's wage because she noticed that she earned much less than colleagues who had the same job. Wage and extra have to be negotiated, there are not any pre-determined scales or evolution; wage raise is up to the one who negotiates best. She now believes that she has been too modest when she negotiated her wage. Yearly evaluation with the manager aims at defining yearly objectives, which can be qualitative. This year, her objective is to stick to her part time.

Many people work more than 10 hours a day in her firm, but it constitutes a vicious circle. People believe that if others do it, they also have to. Once in the circle, it is hard to escape.

She believes that in this world, people feel in competition with each other, but it is mainly a male attitude. She thinks that in the computing world, jealousies between men about wages, cars and PC are important.

She likes her job and would like to go on, but does not have any career or mobility project. See has decided to give priority to other life objectives; she invests in things she likes.

Summary of biographies – France

ANACT
September 2003

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1. Preamble

The WWW-ICT has set itself the objective of conducting an empirical study into gender-related disparities in the ICT professions, namely through interviews of men and women working in these professions.

The empirical nature of this survey is to be highlighted, as the sample of **20 people** interviewed out of the **650,000 people working in this sector in France** puts into perspective all excessively generalised conclusions. However, the elements checked off during these interviews help to provide concrete illustrations of specific trends, confirming or invalidating the explanatory variables produced by the state of the art within the framework of this project.

Moreover, these biographies, completed by the 100 others compiled by our European partners, enable us to identify a few variants and invariants in the careers of the men and women interviewed and also to understand how, in their careers, factors of influence structure, cancel or add up, how situations are experienced and perceived by the people involved. For example, the in-depth analysis of the interviews shows that the people interviewed tend to minimise differences in situations between men and women, whilst describing them very precisely.

Finally, we have tried to identify how, in this fairly young professional sector, situational hierarchies are repeated, recomposed or transformed with roles reflecting what we know

about inequality between men and women in older-established and more traditional professional sectors.

2. Brief quantitative summary

This intermediate summary involves 21 interviews, 17 women and 4 men. They were conducted in three regions: the Greater Paris area which concentrates half of information and communication technology establishments, the Picardie region, next to the Paris area and the Limousin region, an isolated rural area with low industrial activity.

The people questioned were aged between 29 and 40: 6 were under 30, 12 between 30 and 40 and 2 over 40. 7 are single and 14 married or living with partners. 12 do not have children, 5 have 1, 3 have 2 and one has 3 children.

Their initial training level was all baccalaureate level, going up to 5 years' post-baccalaureate study. Only the two youngest of the interviewees have received "IT" initial training. 5 a scientific background, like biology, 6 had a technical background, e.g. BTS (vocational diploma) in electronics, or engineering training and 6 had studied at university with subjects including languages, anthropology, art, law, etc.

Moreover, it seems important to highlight that there are currently very few qualifications specifically dedicated to ICT, even if they are developing. Furthermore, the youthfulness of the sector, the characteristics of hazily defined jobs, the skills required (namely highlighted in the state of the art and sector-based findings, particularly in software engineering and e-publishing) as well the job titles in question, do not always map out clear access to the different professions in this field.

3. Initial training and the influence of the family context.

Initial training is chosen in a family, educational, social and cultural context, which is not neutral from a gender-related social relations angle. These **different factors interact** and the indication of a dominant influence career decisions is not always easy to determine. However, in all the interviews, the influence of family and friends is clearly expressed, especially that of the **father**: "under social influence and the influence of the father", "it was my father who ruled in the family", that of the educational world: "social pressure and careers advisors, teachers", "careers advisors dissuaded my parents from…" Advice but also support came from family and **friends in particular**.

Only one of the people interviewed clearly indicated that "my parents let me choose without forbidding or preferring one direction more than another". "Teachers had no specific impact". If she is now in the ICT sector after having tried out English then art at University, it is because, when she decided to start work, new technology was an opportunity meeting her interest in "the manipulation of words and the field of thought".

These social, family and educational influences are mainly moulded around academic achievement. Whether for boys or girls**,** orientation logic is conditioned by school results. Then comes the representation of professional success: "if you want to be someone, do a baccalaureate C (maths option)", it is best to study for a long time" and in this context, the profession of the parents, when it is the sign of social and professional success, is highly influential: the choice of engineering like the father, the mother's insistence at following her professional example, or becoming a teacher "like my mother and elder sister".

Taking into account the average age of the people interviewed, it should be noted that, at the time of their initial training and first career orientation, IT was not present in schools and in few families. Some only learnt of its existence very late on, like one person, from an island in the Indian Ocean, now an ethno-methodology and IT graduate. Only orientation towards purely technical branches could enable people to approach a computer. One of the people interviewed underlines the fact that she never received IT training, even at university, even though students' theses had to be written on a computer. She also states that she perhaps would have chosen an IT orientation had she been made earlier aware of the potential professional opportunities. It is obvious again in these interviews that **girls were not, and are still not, encouraged during their initial careers guidance in school towards technical branches**. Only one of the people interviewed made a deliberate IT choice against her close circle's opinion: "you are a girl, computing is not for you". She wanted to rise to the challenge, helped by a friend who had more trust in her and, when the first site she created aroused the admiration of her family and friends, they started to encourage her in this career choice.

Others chose training including IT once aware, in their very first months at university, that the course chosen did not suit them. For one of them, information on short professional training, corresponding to a search for emancipation and independence and combining her taste for physics and chemistry with IT made her opt for this sector.

Comment: Will newly created qualifications in France be grasped as new opportunities for and by these women? How are they encouraged and supported to facilitate access, namely through professional degrees, without forgetting the upshot: will they stay?

4. Professional experience

Everyone questioned has held several jobs in different companies before their current employment. Only one woman having been to engineering school held several positions in the same company but she did not specifically choose ICT: before 1997, the year she qualified as an engineer, she started to look for work during the telecommunications "boom". "There were lots of job offers in the sector". She therefore looked into them "while resigning herself to it".

The first jobs were marked by the discovery of working life and awareness, to varying degrees, of what each person expected of professional life. These first experiences were the time when each person explored various professional situations to gradually question their relationship to their professional lives and, after small and unsatisfactory jobs, they decided to build life projects. In this context, job changes are not necessarily considered as successes or failures as, in most cases, they tend to be seen as **a source of enrichment**.

Job changes can thus be the result of jobs that do not satisfy expectations but are also due to circumstances and opportunities grasped. One of the women interviewed insisted on these stages where "you train yourself, you construct yourself". There was the underlying hope of finding what was really wanted. These **non-linear careers**, with respect to their initial training and throughout the different stages of their professional life, explain many of the jobs held today by the people we interviewed.

The skills sought in several **ICT jobs were not necessarily specific technical skills,** but also relational, commercial and creative skills that undeniably favoured the recruitment of people with diversified backgrounds.

We observe, in the careers of the people interviewed, professional changes caused by the requirements of personal life such as a woman following her husband, military service or health.

If professional changes are compared, it is apparent that changes for the men questioned were more dictated by **the strategic construction of a career than in women where factors include opportunity, curiosity but above all the necessity of compatibility with family responsibilities**. In this way, the search for a balance between professional and family life is an important factor for women, as is the anticipation of future possible constraints by younger women, which sometimes restricts their choice. Only a months-long absence from his child made one of the men interviewed think about this and decide to change jobs.

The conjunction of initial professional experiences, the discovery of IT, the Internet as well as the dearth of candidates in these sectors favoured, for a time, the recruitment of young people with a good scientific background (biology, physics, chemistry, etc.) or skills in communications and creativity. The people interviewed all had a certain level of training and grasped these various opportunities to which were added a certain curiosity for this sector and a good dose of dynamism.

Comment: most of the experiences described in the interviews and leading to jobs in this sector are, for women, the result of crossovers between general training and the needs of this rather unstructured and informal sector, between skills linked to the technical medium and those linked to the content to be processed, which led to openings for women. With more precise structuring of the work market, will these opportunities continue or will they be reduced by greater technical selection?

5. The current position

After what has been previously written about initial professional experience, it is not surprising that the current job was obtained by the people interviewed following an unprompted application, the creation of a position by the person, determined steps to move or change position within the same company. A professional change, related by one of the people interviewed, is quite significant of this inquisitiveness and dynamism: after the "discovery" and long training, during personal time, in ICT at university and after success in the first year, this person asked superiors to create a position dedicated to ICT and this training was then included in the corporate training plan.

But, although the sector has employed people quite easily in recent years, it was also necessary to be interested in it. In 2000, "there was a real boom in the sector… I found a job within 3 weeks. The recruitment agency's strategy was to recruit heteroclite, self-trained profiles", confirms another person.

The major characteristics of jobs occupied by the people interviewed are so-called jobs with responsibility (which is not linked to a level of remuneration). **Job titles vary** and do not provide a generalist picture of the real activities and skills required by the position. Most stated that they are very autonomous in their work, which does not prevent close cooperation with co-workers and even teamwork

This degree of autonomy and responsibility should be analysed more in-depth as it does not clearly appear in the interviews. Each person has his or her own representation.

Only one of the people interviewed strictly meets the criterion of autonomy and responsibility. She is a "net architect" and works freelance, which enables her to work from

home and choose her own customers and consequently her work rate. It is a possibility envisaged by others.

Salary levels vary. However, apart from people working in large companies, they are considered to be low. Although, on recruitment, there is no apparent difference between men and women the difference is made in promotions. They seem to be more difficult for women owing to their presumed non-availability, leading one person to claim that "maternity is a discriminating factor".

At this level, it is possible to measure the denial of the difference in treatment of men and women, as justifications are found. It can be said by the same person that, "there are in principle no differences between men and women, the difference may intervene in wages, but it depends for everyone on their level and skills". But what skills are they and, above all, there is no mention of the difficulty for women to access certain positions, especially management".

The salary issue should be compared with what people say about their professional investment with respect to their family life in particular: work harder for a more comfortable private life rather than for a precise rise, states one of the women. The interest value of the work is more important than its recognition. This way of looking at things induces women to accept the fact that they are less well paid.

This feeling of dissatisfaction shared by all produces the "feeling of being **underpaid with respect to the level of qualifications and skills acquired" and the workload**. This seems to be identical in the private and public sectors.

Whatever positions are occupied, everyone agrees that the conditions of work "generate **latent stress** as it is consuming and it is necessary to remain technically informed. Permanent self-training is necessary, not because it is asked, but because it is a question of responsibility. It is therefore necessary to work and read at night or at weekends to keep ahead".

The question of **work hours "imposed" by a job in this sector** is mainly considered with regard to each person's personal situation. The question of work organisation is never raised: **the method of organisation and constraints are acquired conditions and not put into question.** It is up to employees to adapt, if not they will have to leave the sector

Some state that they work too hard but there is no choice in view of the viability of the company. Another person states, "I work a lot but my work hours are calculated on an annual basis". Another person explains, "you feel the difference when you have children, because you can't stay late at night and are not as free… single women are treated like men". Without children, women can easily go home late or not go home for lunch. Here again it proves that it is **difficult for women to find the right balance between family and professional life**.

Comments:

1) If, in principle, it is stated that there is no difference on recruitment, careers are rapidly differentiated especially once women leave their single status: they are no longer trusted on their availability for work and the inherent constraints of work (at least stated as such) in this sector.

2) Remuneration is unsatisfactory with respect to the investment in terms of initial training, skills to be maintained and permanently upgraded and work time constraints.

6. The personal situation

Of the dozen people interviewed, ten are married or live with someone and therefore only two are single: a man and a woman. Six have no children.

As we have already observed, the personal situation has a strong influence of women's professional lives.

Right from the start of a career, the question of family life arises, namely concerning children, but for women only. For example, the tutor during an internship during one woman's engineering studies asked the question of how the intern was going to reconcile her family and professional life. This questioning continues as this female engineer working in a large company declares that in terms of family organisation, with a senior management husband, like her, she is the one who looks after everything at home: "I do everything in the home, I look after the children when they are sick, etc. The reconciliation between professional and family life lies with the woman, even when she has the same level of qualification". But this acceptance is shared by others. Several put their career after family life. As another woman explains, "it is normal that he earns more than her and that the woman looks after the children". She knows that she could not count on him if they have children: family life for her will thus "negatively affect my professional life".

One woman has moved towards a job, which although involving the web, has few work-hour constraints to allow her husband to find a job in the sector he wants more easily.

We again observe that **personal and family life is a central issue for women: central for the people recruiting them and for themselves**.

A new trend is emerging in couples where the choice of professional life (freelance work in IT for one and part-time work for the other) harmonises with their personal life choices or domestic and family chores that are increasingly shared. The case of the single man, with a child raised by his ex-partner, who has chosen to live and work near to his child, seems exceptional (even if he does not have daily custody of the child!)

Mutual support between spouses or partners for their professional lives does not work both ways. The support varies depending on whether it is experienced by a man or a woman. In two significant examples, even if both want to remain in control of their choices, the support given to each other is not approached in the same way. In the first case, **she** is in charge of household management and administration (as is usual in her own family), **he** looks after the money input and he declares that he would never have succeeded in his career without the help and support of his partner (who does not work). In the second case, the interviewee (a woman) has undertaken a long training programme, even though her husband - who is very busy in his own job - is rather reluctant, he gave her complete freedom. However, she takes full charge of the 3 children and manages the household: it is up to her to get organised.

Rather a caricature is the position of the single woman who does not really think about specialising too much in ICT and the web as she considers that this sector is not easy to reconcile with the role of mother (which she plans will have a strong impact on her life as a woman and mother and on her career). She does not want to work in a start up, as the hours are difficult and not compatible with family life (which she dreams about).

If reconciliation is too difficult, the constraints of professional life can lead women to leave the profession. "I liked the renewal and progress of the profession. But in IT, you have to work at night, with crazy work hours: it is not compatible with family life".

Comments:

1) Personal life seems to direct professional life and not vice versa for a large number of women

2) The organisation and work conditions in this sector seem to reinforce and justify (in their opinion) over-investment of women in family life. Men (say they) value their partners who take care of family tasks, allowing them to satisfy the requirements of this sector.

7. Professional culture

Professional culture has mainly been approached from the man/woman angle and gender trends. Someone therefore states, "in this sector, gender-specific functions exist but jobs are namely linked to culture, as there are few women IT professionals. It is a man's world. The "development" function corresponds to women and "networks" to men. On the basis of these assertions, recruitment in "network" positions tends to discriminate against women.

Another states that there are still differences between men and women in the workplace. This is not so in her present company, but she says, "it is a French condition". "**Women always need to be in peak form**". They need to prove their capacity to be in the same position, more than men, or to be listened to.

La **pressure of business** is also very strong. It is even stronger for women as the expectations of the recruiter concerning **a woman are higher than for a man.** "She has been recruited and needs to be able to seduce more easily than a man" and thus win more contracts. If the results are comparatively lower than a man, it is seen to reveal a lack of competence".

Going back to work after maternity leave is sometimes difficult. Work conditions that change combined, for example, with the inability to work from home which had been accepted before the birth (to avoid having to employ someone else during that period!) and, for another woman, who when she returned, found herself in conflict with her assistant, a man who cannot bear being managed by a woman and took advantage of her absence to take over. **This "young" sector therefore still reproduces the same old patterns!**

Here are two significant comments relating to professional culture and relationship with work: "men need recognition through work, women put things into perspective with children through their domestic role" and one woman adds "it is not necessarily a sexist view". Finally another woman without children states that "having children will have an impact on work, society is made that way. I will have to make choices when the children arrive".

Everyone has a similar vision of the sector and professions; the only difference underlines the varying degree of their appetence for ICT. All agree that, it is necessary to be inquisitive and want to find out what is going on to monitor the development of the market. For example, in the call centre sector, the sector has good potential for another ten years; it is therefore important not to get boxed into a single technique to continue to work in these professions.

A long phrase by one of the women, a mother of three, fascinated by information and communication technology discovered at the age of 36 after several professional experiences, highlights this approach: "**ICT is an innovative sector**, it provides **innovative work, allowing new ways of working**. There are no limits. The value of this work is not to know what we will be doing in 5 years time, as we can't imagine what information and communication technology experts will think up within that time. It requires **endless ongoing improvement**. The horizon is clear. Keeping afloat in this type of profession and work is a

challenge in itself, therefore fascinating. I think that the ICT world is more open than the current world closed in by geographic and political borders, by its own social rites".

Technological monitoring is an important theme that is practically present in all interviews. It raises the question of its organisation and, as we will see, tackles the **balance of work time/spare time** as the majority of employees do it outside work. However, no interviewees talk about new ways of working with respect to work organisation, if only to say that many work more than the statutory 35 hours (in France) and that overtime is not usually paid and rarely predictable.

The organisation of work and employees' workload do not seem to be major concerns for companies in these sectors.

One point that it is important to underline, which was not covered in detail as such but is read as a watermark, is the importance of relationships which are made during training and professional life in careers. The role of these **formal or informal networks** enable people to stay in touch with opportunities that open up in terms of jobs or new technological inroads. These networks are built inside and outside work. Obviously they are not specific to this sector, but the rapid development of ICT makes them even more important. Yet they are time-consuming.

Comment: Whereas in ICT, as shown by the majority of interviews, ICT skills are not necessarily technical skills, the weight of technical criteria (mainly masculine profiles) is heavier than relational criteria (mainly feminine profiles). There is a balancing between them and this can be seen in the salary differences and the lower number of women managers.

8. Ongoing learning

It appears that in this sector and professions, keeping a good technical level remains a problem. Tele-learning and on the job training are largely used. "There is everyday learning. It is necessary to keep aware". It is a profession where people cannot stop and "the more you work, the more you learn". For some people, this profession becomes an invasive passion, even during their spare time. What effect does this then have on the **balance between work time / spare time**? As women are more involved in family life, which thus reduces their time available for informal networking, as we have stressed, and makes ongoing apprenticeship difficult as it is often done outside work.

Ongoing apprenticeship is also another problem as, someone comments, there are not enough resources made available to self-employed workers. Yet this is an orientation or wish expressed by several people. Owing to the speed of the development of ICT, some think that it is important not to remain restricted to one specific field. Keeping a leading edge in time is not always easy and the drift towards team management is a possible development with training directly linked to the company. **The question of a second career** for professionals in this sector remains an issue.

Comment: In all the interviews, we have noted the importance of in-the-field training. Questions can however be raised concerning this type of training insofar as there is a current trend towards training branches and direct search for an appropriate training/job match.

9. Conclusion

From the analysis of the 21 biographies conducted in France, we can identify possible areas of action which could reduced gender-related disparities and increase equal opportunities in ICT professions.

- **Careers guidance for girls** which does not perpetuate the images of suitable jobs for men or women.

- **Careers and job information** focused on activities and skills (technical skills and other skills sought).

- **Organisation of initial and in-service training** which offers access to the different professions and maintains employees' skills in this rapidly developing sector.

- Reflection on **work organisation** to:

    - Build a new service relationship to reduce pressure on employees, namely concerning time constraints,

    - Determine the **work load** of each person compatible with the achievement of objectives, maintaining and developing skills

    - Favour a better **balance between work time / spare time.**

The analysis of biographical interviews in Ireland

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1 Women in the Irish software industry: an overview

The Irish economy has undergone great transformations in the last three decades and, especially during the 1990s, it witnessed an exceptional economic growth. This brought with it a sustained expansion of the labour market where the labour force grew by around 38,000 per annum between 1991 and 1999. Together with other factors, namely increased educational participation and the growth in adult population, the major contribution to this extraordinary growth comes from the growing participation of women in the labour force. Female employment expanded also under the effect of other socio-institutional factors, namely the modified fertility patterns, higher educational achievements as well as the removal of legislative constraints on female employment and the introduction of the employment equity legislation. The female participation rate grew from 35 per cent in 1991 to 44 per cent in 1999. In 2001, it was 56 per cent (EC, 2000).

The ICT sector is among the sectors that drove the 'Irish miracle'. Total revenue of the industry grew by 15 per cent per annum during the 1990s. At the end of the decade, the sector had a turnover of 6 billion Irish punts and the country overtook the US to become the world's biggest exporter of software products[6]. The employment levels have mirrored the success of the industry. During the 1990s, the overall annualised growth rate of employment in the Irish economy was 6 per cent. At the same time, employment in the software industry was growing by 15 per cent annually (Arora et al 2001: 5). Moreover, in the 1990s, employment in the software sector grew faster than all other manufacturing sectors (McIver Consulting 1998: 12) and the growth in the second half of the decade was almost twice that in the first (20.6 per cent and 10.9 per cent respectively) (Crone 2002: 5). At the start of the 1990s, the sector employed just fewer than 8,000 people. By 1999, more than 17,000 new jobs had been added to the sector, making one of the largest contributions to total employment growth in Ireland in the 1990s (Crone, 2002: 2).

At the end of 2002, 28,000 people were employed in the industry (Enterprise Ireland, 2003).[7]

In coincidence of the impetuous growth of the industry, a significant number of women entered the sector. Between 1991 and 1996, the number of women in computer applications increased by 15 per cent, from 6207 to 7172. According to the latest data supplied by the CSO (2003), more than 10,000 women work in the Irish software industry, representing 30 per cent of the sectoral workforce. Women are less likely than men to be self-employed (4.5 per cent of men versus 2.8 per cent of women), but also to have higher levels of education (72

[6] However many of these exports are accounted by sales of software products that originate in the US and are localized or simply distributed from Ireland.

[7] For the Central Statistical Office, which bases its analysis on the Nace 72 classification, the industry employs about 31,000 people.

per cent of the men working in the industry have third level education against 63 per cent of women).

Although less than in other sectors, such as health, education and public services, it is undoubted that the Irish software industry witnessed a process of feminisation of its workforce. Despite the incapacity of third level education to produce enough technical graduates, a significant number of women entered ICT organizations, also with 'soft' technical skills, answering the call of the Government and other institutions that, with a series of initiatives, had sought to orient women towards more technical subjects at university and more technical sectors in the economy. Women's presence in the Irish software companies has posed therefore unusual challenges at organisational level. Yet, the slow down of the industry's growth pace in the last couple of years is affecting women's professional paths. Cases of temporary –and even definitive- exits from the industry coexist with reinforced career paths; professional detours and 'lateral career moves' coincide with company's restructurings, in a continuous re-definition of professional – private boundaries.

The next sections of the paper use the research qualitative material to explore some of the issues highlighted. Specifically, it is suggested that Irish ICT companies are failing to realise the gendered nature of work organisations and, consequently, to accommodate female presence in the industry. The management of diversity, based on the recognition of the value of difference, is generally absent; yet, structured and organic policies dealing with a dis-homogeneous workforce are marginal and unable to modify the prevailing attitude that considers them unnecessary. New and different forms of inequality at the workplace are therefore being produced in the industry.

Individual biographies have been the instruments through which women's presence in the workplaces has been investigated. Twenty biographical interviews were conducted in the period between October 2002 and February 2003. The women interviewed have different ages and belong to different professional categories; married women and women with children were interviewed besides single women. Some men were also interviewed as a way to compare and contrast experiences (table 1).

Table 1 - Informants' basic information

Initials	Sex	Age	Marital Status	Children	Job Title
EP	M	31	Cohabiting	None	Senior software engineer
BOD	F	32	Married	None	Senior software engineer
LC	F	30	Cohabiting	None	Technical writer
GA	F	24	Single	None	Localisation engineer
SP	F	26	Single	None	Information and technology manager
DK	F	27	Cohabiting	None	Data mining manager
AL	F	28	Married	None	Project manager
RB	M	31	Cohabiting	None	Developer
AR	M	32	Cohabiting	None	Developer
LS	F	39	Married	One	Programme manager

MP	F	32	Married	One	Software developer
AC	F	-	Married	Two	Senior engineer
TB	F	32	Cohabiting	None	Technical writer (left the industry)
IOD	F	33	Cohabiting	None	Technical writer
MOD	F	35	Married	One	Senior software engineer
ACo	F	31	Cohabiting	None	Unix sys administrator
DR	M	34	Married	One	Programme manager
GC	M	31	Cohabiting	None	Marketing manager
MM	F	41	Cohabiting	Two	Engineering manager
JB	F	25	Single	None	Software engineer (left the industry)

Table 2 - Job description

Initials	Job Description
EP	Senior software engineer. He writes and tests codes, he also designs manual test.
BOD	Senior software engineer. Responsible for building the lay out of bills for a Telecommunication company. She develops the system of the bills and then the system that supports it. Once the thing goes into production, she has a supporting role.
LC	Technical writer. She writes manuals to explain people how to use different software programmes.
GA	Localisation engineer. Localisation of the software in different languages. No translation involved but she makes sure that the key and interfaces work properly. When a translation is done from English into a western European language, it is 30% longer. There might not be enough space allocated by American software engineers for a word/sentence to fit in the interface so she produces the space necessary.
SP	Information and technology manager. She buys the hardware for a big multinational company. She actually does the physical ordering and makes sure that everything is on time, when people need it. Her group does also the support to the hardware. She doesn't deal with external clients but with people in the company.
DK	Data mining manager. The job consists of finding pattern in the data of a telecommunication company. She tries to predict when people are going to leave, when they are going stop using the phone and to identify the users' profile of a certain type of product, etc. She deals with sophisticated statistical packages.
AL	Project manager. Responsible for installation/implementation of Oracle on line stores in order to sell Oracle products to customers in two new countries. Use of Oracle software to sell on line products.
RB	Developer. Review and analysis of project requirements, design of the system architecture (it could be just a part of a system), development of the system/new feature (coding phase in C++ or Java programming language), testing of the system/new feature.
AR	Developer. Review and analysis of project requirements, design of the system architecture (it could be just a part of a system), development of the system/new feature (coding phase in C++ or Java programming language), testing of the system/new feature, system configuration

LS	Programme manager
MP	Software developer
AC	Senior engineer. The job involves: -working with Product Management to define the content of future releases of products - planning, execution and timely delivery of projects within engineering department - managing the performance of the engineers in the team, assigning tasks, setting and reviewing personal objectives and conducting annual performance appraisals
TB	Technical writer (left the industry)
IOD	Technical writer. Writing educational content.
MOD	Senior software engineer. Software programming –design and testing of software products.
ACo	Unix sys administrator. It involves the administration of the Unix system that runs the factory production floor. In the company, there are about 33 Unix servers and she is responsible for them. It implies monitoring, checking them up and fixing when the system fails.
DR	Programme manager
GC	Marketing manager. He deals with the clients of the company all over Europe. In his job, the skills are more closely related to marketing than to computers- technical skills.
MM	Engineering manager
JB	Software engineer (left the industry)

Following the contributions of some post-structuralists scholars such as Foucault, Derrida and Lancan, the investigation assumes that the subject and subjectivity are constituted in and through language and not simply mediated by language. By rejecting the notion of individual identity, with fixed and enduring properties, identity comes to be conceived as a narrative. The telling of one's own story becomes an important contribution to the process of identity construction. Broms and Gahmberg (1979) argue that the telling of one's story has a recursive nature and a self-communicative character as an ongoing process of articulating sameness and difference, permanence and change. By making distinctions, communicating certain experiences whilst silencing others, a process of structuring of identity occurs in which individual meanings are accommodated among a range of possibilities suggested by the discourse itself (Gherardi, 1996). Positioning gender identity presupposes a discourse order where gender relations are the outcome of discoursive practices. In other words, a position is what is created in and through conversations as speakers and hearers construct themselves as persons. As stressed above, the narrative approach is complementary to an analysis of the structures of organisations.

2 A project-led organisation of work: opportunities and limits for women

The organisation of work in the overwhelming majority of Irish software companies is based on projects. The organisation of work is centred on the product to be released and the date of its release. Depending on the product to be developed, a project may therefore last from a few days to some years. A series of small milestones and deadlines define the time needed to develop a product. The final deadline is dictated by market expectations linked to sales. Employees, typically engineers, are organised in teams: each team contributes to the development of a specific aspect of the project. In turn, individuals in each team are in charge

of a specific job. In some cases, people work on different projects. The organisation of work therefore faces the challenge of two levels of coordination: the coordination of the team in relation to the other teams in the project and its internal coordination. The organisation of work is undoubtedly parcelised: individual workers are often called to develop a specific code so that the work becomes very individualised; however, in contrast to traditional organisations, in these companies, such a parcelisation occurs in a context in which workers are much more aware of the general project, of its phases, of the work developed by other teams and obviously of colleagues' work in their own team. As indicated by one of the interviewees praising the project-led work: "the project gives you a clearly defined objective".

Typically, a lead engineer, with a co-ordination and supervision role, manages a team of engineers. The internal hierarchy is extremely limited. The relationships between employees and managers are very frequent and close. Because of the project–led organisation, the pattern and rhythm of work are dictated by the achievement of intermediate deadlines and, then, of the final one. Indeed, company emphasis is never on working time but exclusively on the completion of the work. The flexibility of working time is a distinct aspect in the work organisation of Irish companies. Although formally fixed between 9 and 17.30 (or defined by core hours), workers are often free to adjust their working times according to their individual preferences i.e. by going to work early in the morning or very late, or for instance working during the weekends. The commitment is towards the deadline: this can be achieved working in different ways. Company emphasis is therefore on self-management and responsibility. Without heavy formal control, individuals need to be able to manage themselves. Responsibility is towards the project and towards colleagues and friends who are in the team. However, daily or weekly meetings are set up to review the progress.

Although aware of the existence of a variety of organisational cultures and, therefore, of the risk of generalisation, it is possible to affirm that the prevailing culture in Irish workplaces is young, dynamic and performance-oriented. The long working hours culture is more a myth than an actual reality. At managerial level, a consistent mobility is requested although this varies between companies. Social events often take place with the aim of team building. Training occurs on the job in a continuous but rather non-structured way.

2.1 Flexible working times and the commodification of working times

Flexible working hours and employees' freedom to manage their own work are among the most relevant connotations of the work organisation in the Irish ICT companies. Workers work on individualised schedules: the organisation becomes a mosaic of working times that satisfy individual preferences and are modulated in relation to the daily work. As suggested below:

> With concern to working time, the standard would be 9 to half past 5, I suppose traditionally, but in our teamwork we are actually quite flexible and so particularly it depends on where people live or if they have activities in the evening. It is ok start earlier and finish earlier or start late and finish late, provided that the work is done (AL).

Nonetheless, as emerged in many narratives, the project-led organisation, centred upon the flexibility of working times and the commitment to the deadline, is very prone to erode the private sphere; sometimes to collide with private interests and, ultimately, to become a source of disadvantage at work when family commitments exist and need to be fulfilled. Undefined working hours seem to have contributed to blur the borders between work and private life and the incursions of the first in the second become difficult to plan. This is very much the case when the deadline of the project approaches and ends up taking priority over workers private

life. In these occasions, workers do not know what to expect; they only know that they need to be ready to respond to organisational needs, usually stretching their day of work.

The composition of the Irish ICT workforce[8], young and professional workers, satisfies the request coming from the organisation of production. As underlined by many, there exist 'tacit' or "unspoken agreements" in the industry where long hours are worked in exchange for relative flexibility at work; in some cases, the incursion of work into the private sphere is formalised. As indicated below:

> in your contract, it says if you have to work overtime to get your work done it is expected of you. It is actually in the contract when you sign, you cannot say you didn't know (AL).

Nonetheless, whilst the tacit pact existing in the industry is bore by the vast majority of workers, it is also true that such a commitment is lived in general with certain sufferance. While the vast majority of workers accepts that "before the deadline, you work longer", there are examples of active resistance. Below is the most emblematic case:

> It is usually a sort of countdown. You cannot do it very long and I think there were a lot of problems last time and it depended on the management for promising very aggressive deadlines. […] Normally you are under a pressure like that only for two weeks. […] we went on for 6 weeks working extremely hard and at the end there was a lot of anger. It wasn't really planned. We had meeting outside, addressing the problem, why it is happening and how it would not happen again. … Yes, outside, when we weren't in the office. Then, everyone was making suggestions, anonymous suggestions and the manager gathered all these, analysed them […] you'll start thinking that it is not worth it (EP).

What is more interesting to notice is that, in many companies, long hours of work, which in the vast majority of cases are potential or sporadic rather than actual and continuous, come to symbolize commitment to the organisation, responsibility and productivity. It is these expectations that affect negatively the response of a particular segment of the internal labour market, namely the one identified with women with children. Their inability to ensure the commitment requested by the organisation, in the way in which that commitment is constructed, leads these women, especially if they have a managerial role, to a variety of strategies of resistance. In some cases, the 'no-compromise' choice implies the giving up of any further career advancement in the organisation.

> The fact that I have to leave at 5.30 every day I think would make it difficult for me to have more responsibilities. I think I could do more […]. It is not limiting me and my current job and I am not looking for anything else at the moment. I made a choice (MP).

In other cases, women become much more focused at work and the working day lacks of any distraction or leisure time. In other cases, there is an internalisation of understanding and help from other colleagues.

> Certainly in [the name of the company], there would be an expectation when you reach the senior level that you would be available all the time. I think it is accepted that I leave at 6. Over the last couple of years, there were more and more people who have had children […] generally people accept that if you need to leave at 6 o'clock, you need to leave (AC).

2.2 Working women and employment contracts

The vast majority of Irish companies do not have in place formalised policies to accommodate workers who want to access to non-full time contracts. The prevailing young component of

[8] The average age among the people interviewed during this research is less than 32 years.

the workforce in the industry has for long rendered it unnecessary organisations' adoption of non-standard contracts. It follows that, if necessary, specific arrangements are worked out *'ad personam'*, through individual negotiations, and often at great cost for the single worker. Out of the four women with children interviewed, three were on a full-time job, working therefore the standard eight hours a day. Yet, individual preferences with concern to working times become more difficult if they have to be reconciled with managerial responsibilities. As indicated below from a woman engineer:

> I have 2 engineers in my team who do that but it is easier for an engineer than for a manager, because an engineer would be in touch all day by e-mail and it does work pretty well, but I think for a manager you cannot do a telework, you need to be in the office, going around, talking to people and seeing what's happening, getting updated, etc. There are people like [the name of a female colleague] does 4 days a week. She does not work Wednesday and she stays till late 8 o'clock every Tuesday night and she comes on Wednesday to check her e-mails. So I am wondering if doing the same amount of work in 4 days… is it worth it? They expect you to do the same in less time (AC).

More importantly, some women believe that a reduction of working time or the choice of an atypical contract affects their position and reputation in the company. As the same manager explains:

> It's more difficult for women to reduce the working hours in the company. […] if you want to reduce your working hours there is a kind of feeling that they could get someone else who could do the job and do more (AC).

In addition, it is a well-established practice in these companies not to replace women who are going to take maternity leave. The team in which the woman works re-arranges its work; its members take charge of the functions exercised by the person who is leaving or is away. This is a source of anxiety for women as the sense of equity and responsibility towards their colleagues is high. In the words of one of the interviewees,

> [the name of her company] doesn't replace people when they are on maternity leave. It does mean that there is more work for everybody else. It is a disruption (AC).

2.3 The 'flat' organisation from another perspective: the personalisation of work relationships

The organisation of work in the IT industry in Ireland is characterised by flat structures. Managerial levels are extremely reduced and career advancements are based on individual performance. This organisation of work stands in stark contrast with the features of bureaucratic organisations, characterised by grades and rigid career moves. In contrast to standard organisations, in the Irish ICT companies, managers are visible and physically close; they are known – as indicated by a foreign worker "you can eat with them and call them by their first names" (AR); they are part of the team. In these contexts, the distance between managers and workers is effaced and a direct relationship is established; problems are discussed openly.

However, this organisational model can also lead to the 'personalisation' of work relationships. The critical aspects that are connected to this situation have clearly emerged in the discourses of the women interviewed. It would seem that it is the capacity of establishing 'friendly' work relationships with the manager rather than 'professional' relationships with him/her to ensure women an uncontroversial positive outcome at work and the actual possibility of balancing work and domestic responsibilities, when these exist.

This is an aspect that seems to differentiate women and men's experiences. In many of women's narratives, and in none of the ones told by men, the negative personal relationship with their manager rather than the actual content/nature of the job has been the source of negative work performances, of emotional strain which, in the most serious cases, led to the decision to abandon the job. In other words, it is not the incapacity of dealing with the job or other work experiences that affects the choice but rather the inability to harmonise personal characteristics.

> The guy I reported to I never really got on well with him, I never really thought he listened to me or wanted my input, so I left. I never tried to make a deal with him. I think it was more than the fact I couldn't really get on with him (LS).

However, situations in which women had to manage difficult relationships with the management are much more recurrent. As explained:

> I know one girl […] she is very able and she had a lot of difficulties related to the project she worked on, she got very frustrated because her immediate boss he was very dismissive of her problems […] she was always treated by her superior like she wasn't able: "this was a very difficult job for her, she was not really up to it". […] and generally speaking the women in the department did not particularly liked that manager they found him quite patronising (LC).

Strategies are put into place on the basis of previous negative experiences:

> I learnt a lot from my previous job. I would actually sit down and tell the person if there is something wrong and why we are not getting on. And if we cannot not solve if I suppose I probably would go for another situation, I would probably go above them. If we cannot sort out I would go to them. I was upset when I had to leave the job I use to love my job and it got shit because of just one person (DK).

Conversely, it would seem that friendly or, at least, non-detrimental, relationships between managers and employees are increasingly important in situations in which:

(a) Work and family life need to be balanced:

> My current manager is very understandable, and his own wife has just got a baby and she is a software developer, so she will be in the same situation in a few months (MP).

(b) Flexibility is required:

> I am lucky to have my direct boss, who is very good and he looks after me, he's very sympathetic, helpful and flexible. Above him and around him, if I were with anybody else, I wouldn't get that flexibility (LS).

(c) The spheres of career and promotions are at stake:

> The first time I was on maternity leave I was more worried if I would have a job to come back to. If you go to maternity leave you wonder what would be your role when you come back. […] The first time I went to maternity leave, [the name of a woman colleague] was actually my manger at that time, so she was very understanding about the issue. Then, when I was away she kept my job open for me and it was still available for me when I came back (AC).

2.4 The organisational culture

Despite the relative feminisation of the Irish ICT companies, the culture of work in the workplaces tends to maintain 'male' traits and to be based on male values. At least, this is very much the case for the most technical areas and departments. Here, there is undoubtedly a 'lads' culture or 'locker room' culture. The analysis of women biographies lets emerge the existence of diverse experiences and diverse coping strategies. The prevailing pattern of

behaviour that emerges from the vast majority of women is one of adaptation to the prevailing masculine symbolic environment.

Nonetheless, a difference emerges between younger and older 'adaptive' women. The former have generally accepted the male environment as well as the various expressions of maleness. These women find themselves able to cope with the challenges posed by the stereotypical expressions of maleness, such as the confrontational attitudes among colleagues or the sexual allusions. Their technical background/competence and their familiarity with male environments (i.e. at university) help them in this strategy. In addition, they entered the ICT sector when the female presence in the workplaces had become relatively significant.

> Someone would send a picture of boobs. Sometimes they send it to me as well. It is not offensive. Men do this stuff (GA).

Another segment of adaptive women entered the industry several years ago when female presence in the sector was extremely limited. The feminisation of the Irish labour market was in its initial phase. The narratives of these women are quite different from those of the women indicated above. Being accepted in a male world was much more difficult then, as the environment was quite hostile; diversity was not contemplated. The strategies adopted to face this situation were different: for instance, a 'male' life style was adopted:

> I learnt to be more like a man later. I think I only realise now that I tried to behave the way the way the men behaved in their environment, because there were a few women. When I was in [the name of a company] there were 2 women in engineering and it was a company of about 30 employees, there were women in marketing, so you tended to adapt the male behaviour, drinking, going out late, etc.
>
> You need to compete. When you go in somewhere you have to have your first success before they start taking you seriously and your first success always is you being right and the others being wrong. It is an element to prove yourself, you arrive in a company and you start working on the project and until you get to a position where- there is always a dominant guy in the team- and until he's wrong and you are right, you'll never be respected. Once you have done that once hardly you will be asked again (LS).

For another group of women, generally those who have in common a non-technical background, the male culture at the workplace is something extraneous and, consequently, something with which it is difficult to come to terms. The male environment, either friendly or hostile, is experienced with a sense of uneasiness that often leads them to certain marginality. Reciprocal rejections are frequent. It is important to stress that the male culture is not necessarily to be identified with the one embodied by men. Women can also belong to the prevailing group and male characteristics are associated to them. As indicated below:

> In [the name of a company] I did actually, it was quite competitive and everyone was a career based and driven a lot of people put in ridicule hours, which kind of created a solidarity atmosphere "extra hours are good" but not in [the name of another company] (LC).

And:

> When I started working there, it was a much bigger department, there were about 40 people in the IT department, maybe 3 or 4 women out of 40 and I found I hated it at the beginning. There was a very bulling atmosphere and I don't know if it is in all work places, and people were just not nice to each other. […] May be I felt it because I was a woman, but to be honest, there were women who were in that group of people as well (ACo).

It is also possible that women's presence is tolerated but not valorised; therefore, the sense of 'not being up to the job' is recurrent.

> If you are woman in an all woman environment and you talk about computers it's easier to admit, "I don't know what you are talking about", but if you are a woman and you around men you have to pretend you know everything otherwise they make fun of you. […] I also heard that the guy who runs the department thought that women couldn't know anything about computers at all, so he just ignored them. A lot of women who worked in that department they wouldn't stay there for a long time (TB).

2.5 Between formal and tacit cultures: women, networks and power relations

The combination of the prevailing organisation of work in the Irish IT companies and its prevailing male culture, as analysed above, is extremely important in affecting positions and careers in organisations. Indeed, in some cases, it turns to be detrimental for women. Relations of power are tacitly produced and reproduced among the circle of 'lads', fed by an environment dominated by informality. 'Football and pints' seem to be the dichotomic categories identifying the 'right network'. Insiders have better chances of hearing about job opportunities and, equally important, of gaining a reputation among managers. With concern to promotions, tacit and informal relationships translate into obscure decisions, in the best cases:

> … that often people would become promoted, without anybody else would have known that there was a vacancy available. Suddenly you would hear this person got this job, but in the public sector if any vacancy comes up it is published inside, outside, that is very clear and open, process of applications and interview and selections. In the private sector suddenly somebody has got this job and you go "I would have been interested been in that job", but you would never known (AC).

While, in the worst cases, into the suspect of favouritism:

> I never picked up anything. I wouldn't be surprised if it did exist … because it is very intangible. Basically last couple of promotions I applied for in the writing department with the same manager I was turned down in favour of these male colleagues who had had all these common things, like being into football and being friends of the boss. There is a little bit of sexism, it is not straight forward, but…. (IOD).

And:

> The first manager that I had was woman that was grand and some of the guys in the department used to complain about a lesbian conspiracy because so many of the department heads were women. Then she left and another manager was brought in and he was a man, but he was younger than a lot of us, 2 years younger that I was. He promoted the people he thought were best and you could always see his reasons for promoting people. He had a very clear idea how to make the department works and then he left to fill another vacancy in the company and the guy who took over from him was just dreadful. I left shortly after he got promoted. Apparently he promotes the guys he plays football with (IOD).

Since men are in the best position to capitalize on firms' semi-formal organisation of work, the absence of a formalised organisation structure, especially with concern to careers and promotions, is something that they value. For them, it does not represent a barrier. It is also the case when social events take place. Despite the number of social events has been generally axed due to the overall bleak situation of the industry, these events have a self-selective nature at least for some categories of workers. As indicated by this woman manager with young children:

> It would be normal if you make a release that you go out. Few years ago we used to do things more extravagant, like a weekend in Barcelona, now we go to Stillorgan for few drinks. Of course,

> I wouldn't have gone to Barcelona, but if we go for an event in the evening it has to be an evening where my husband was at home (AC).

2.6 Training

The issue of training is strictly connected to market conditions. The downward phase of the IT sector in Ireland in the last two-three years has affected considerably company's efforts towards the training of their employees. During the boom time, companies used to organise consistent and systematic training activities. They consisted of both in-house and external courses: in the latter case, people would typically go for a week or two to the company headquarter in the US or UK.

Training is now very much left to individual initiative.

Among Irish computer workers, the most common way of keeping updated and informed with technological advancements in their field of work is through the Internet: many informants have reported the existence of specialised web sites where it is possible to find almost any solution to technical problems or curiosities.

> I can learn through the web. There are a lot of web sites that are very good, that give you a good quick overview, quick tutorial examples, questions and answers, people e-mail problems, etc. Then there are so many books, and again the web is useful because you can and some good book on the web (EP).

Other ways of learning are books and specialised magazines.

> We encourage people to do self-studying and do one of the courses on the web or there is always a budget to buy book, so we buy books regularly (AC).

In many cases, learning becomes an on-the-job activity:

> If don't understand something in a document you get, then you ask somebody else. You have to ask (AR).

And:

> If I've got a problem, I ask my colleagues, you know, the more experienced ones (RB).

These quotations suggest the importance of professional communities; the team becomes a training ground for people who otherwise would have no opportunity to improve.

In the following case, the initial training received from the company was not sufficient, therefore she learned about the job while doing it:

> I received no special training. I only had one day …. about one day of training in Unix at all. I picked up at work a lot, like the library management system servers, etc. (AC).

When organised by the company, training now is exclusively in-house. The most experienced people are invited to give talks to the other members of the team or of the department. These talks become the main channel of knowledge transmission.

> We wouldn't have formal training courses, but we would offer engineers in the group to give technical talk, I would ask people in my team to give a talk to the other engineers about some areas that they've been working (AC).

Company's propensity to favour learning opportunities increases when employees are assigned specific tasks within important projects. In other cases, but limited in number, companies seem to favour less short-run attitudes and, for instance, pay for expensive training courses, such as MBAs. However, this is often subordinated to workers' permanence in the company for a variable length of time.

Training occurs during working time but, in some cases, additional time is subtracted to private life.

> In some cases, I spent a lot of time trying to learn new things. This implies that I also spend a part of my free time doing it (RB).

Training is functional and important to carry out the daily work. It is also important to notice that some interviewees are undertaking more courses in order to increase their future opportunities or chances to enter other sectors of the economy:

> I am doing a master in IT and education, so I can get put of my current situation which is my current job, I don't want to do this from 9 to 6. May be I can lecture in a university or third level or may be I can get a job in the department of education, this master can lead me anywhere. It is a long-term plan (BOD).

In some cases, individual requests for training bring tensions in the company. Indeed, well-trained employees increase their chances of getting better jobs and therefore their chances of leaving the company become higher.

> A lot of companies they pay for training you have to sign that you have to stay for two or three years after in the company […] most companies request to stay for while, so they get the profit of what they invested (AL).

Training can become a critical issue also for women who had to interrupt their career due to maternity. MM well explains the feelings and the fears associated to this situation:

> I decided to take 6 moths off and during the 6 months I found hard to find a childcare. I didn't want to stay at home for longer, but I took other 3 extra months. […] Because you come back too cold, you forgot so much in 6 months. […] Yes, because a lot of things have changed and you have been familiar with what has gone.

2.7 Turnover

The dynamism of the Irish software sector represented also by its workers' turnover has slowed down consistently in the last two years due to the instability of market conditions.

In the Irish software industry, turnover is seen primarily as a way of acquiring new knowledge and of increasing one's own experience. Lateral moves from one company to another are therefore regarded as essential to grow in one's own profession. They are also the means with which people make sure to have interesting and challenging jobs.

> If you stayed in a workplace more than 2 or 3 years, well, you wouldn't give a good image of yourself. You would be regarded as an incompetent, somebody who wasn't good enough to have a new chance (AR).

Or:

> This is a dynamic environment, technology changes rapidly. You feel you need to have new experiences. You start looking at your watch … if you've been in a place for 6 years… well, you really think you've wasted precious time. The learning path is cumulative (RB).

However, there are cases in which 'structural' factors affect workers' mobility. This is especially the case when companies are able to offer a series of benefits to their employees:

> The turnover is quite low … I have been there for 5 years and most of the people I know there they've been 3 or 4 o5 years as well, which is unusual. I think it is due to the fact that the company, obviously no company is perfect, but generally, employees are very well treated and they've given good benefits and good opportunities so that results in people sticking around longer. We get medical care paid for and we get even cash for doctor visits and dentists and top of that because VHI does not cover like basic costs. They also give you money for that. There are several canteens to choose, you can apply for funds to go back to college or if you want to go to a night class (AL).

In the years of the boom, for many IT workers, turnover represented also the way in which they increased their salaries:

> As engineer it is normal to change the job and for the salary as well (EP).

And also:

> I think people do it for money. […] The people who work with me they are very young, the younger ones, the young graduates, they don't think to be focused on a career, they don't care about that too much, they want to earn money, live well, etc. (MP).

Besides these reasons and as indicated in section 2.3, there are also cases in which the departure from a company is due to personal problems between workers and managers.

3 Women's professional paths

The main aim of this section is to provide an account of women's narratives with concern to their careers. The objective is to explore the ways in which women in Irish ICT companies have made sense of their work histories, engaging reflexively with what they perceive as moments of opportunity and, conversely, as moments of failure and to highlight the resources they have mobilised during the periods of transition. Such an approach is deemed to provide a better understanding of work histories as it allows us to overcome the limitations of rigid taxonomies present in management studies. Yet, following Baudrillard's image of individuals as terminals of multiple networks (1981), individual potential is realised, as there are others who sustain it.

Three career narratives are presented below. They have been chosen as they symbolise, but not exhaust, the mix of opportunities and limits that women in the Irish ICT companies experience. They highlight the resources mobilised by them, the forms of resistance to organisational constraints as well as forms of retreat.

3.1 On the verge of labour market and organisational segregation: resistance and the opportunity of restructuring

AL is a 28-year-old woman of French origins who entered the Irish software industry five years ago. The story of A is the story of resistance to a process of organisational segregation and, beforehand, of labour market segregation. It is the story of a successful achievement favoured by personal characteristics, the role of a mentor whose values were re-defined through the relationship and a re-organisational process undertaken by her company.

AL holds a degree in business studies and is bi-lingual in French and English. By trusting her good qualifications and the buoyancy of ICT labour marked during the late 1990s, where

people would enter with non-technical degrees, A starts the search for a job that would allow her also to reconcile her private life. She was engaged to an Irish man who later became her husband. The search occurs through specialised agencies as at that stage she is based in London. Despite a favourable situation, her credentials were clearly gendered and institutional forces in the labour market would play in favour of her subsequent segregation. As she recalls:

> I looked for a quite long time […] I was coming over and doing an interviews and the main problem I had was that people would look at my CV like the agencies and they would see a person who does sales, customer service and more this kind of soft business side. I speak languages and basically they would have signed "call centre", answer the phone, call centre and I would have real trouble getting across this, no, this is not what I am looking for. […] I think there is also because there was a huge demand, that's what the agencies where asked for by the companies, they needed perfectly bi-lingual people as many as possible to do call centre and like a lot of French people did not have a fluent English so that's the way they wanted

A's unwillingness to end up in a sector or to do a job she did not like -"there was no way I could do that"- led her to reject various job proposal, stick to the job in London, where she would be responsible of the marketing section but also of many other things, and to postpone her plans concerning her private life in Ireland. Eventually, she found the right agency that selected the company where she currently works.

The company offered her a position in the marketing team. Doing marketing responded to the prevailing social construction of meanings in the organisation. That position was recognised as 'adequate' to her credentials and, at the same time, she accepted it. However, A soon discovered that, on the one hand, the marketing was done at a very basic level and, on the other hand, that she had a certain interest in software and databases. She wanted a more challenging job and she realised she had the capacity to move in the more technical stuff. It is at this stage that A realised that her demands were impacting on a consolidated cultural system that had its own values reproduced into its own structures. The company did not give her any opportunity to move. Officially there were no opportunities to be offered. In practice and informally, hidden barriers were hindering her career. The internal labour market was reproducing the same segregation present in the external one. In other words, women do marketing, work in sales or in the legal department, but not in technical occupations.

A's determination however found support in a manager of the IT department with whom she was in a friendly relationship. He advised her to start an evening course on IT, get a diploma -therefore get the right credentials-, and at the same time he offered her the opportunity to move in the IT department before the actual end of the course.

A started to act as a 'functional consultant', that is she had an intermediate role between the technician who developed the software and the user. This again was not the technical job she wanted. She did it for one and half years. She enjoyed it initially but got also bored after a while. She was interested in computers; maybe more importantly she wanted to have a challenging job with a certain amount of responsibility. Since her dissatisfaction with the job and boredom grew, A took the decisions to leave the company unless something would have changed for her. At the same time she informed the management. Finally, the detour she had expected for so long happened. As she recalls, that was the most difficult period of her professional life:

> I asked for this for a long time. For three months I have been saying when there is an opportunity when do you need somebody to do this or I would like to do this. It took a few months because originally there was no need for somebody to do this proper role in our department. […] I was

> bored, because I was doing it for a long time and the work that I was doing was just getting very repetitive. It was actually almost too easy […]

> what happened was, that at the higher level two departments were merged into one. … As the result of that, there were changes in the different managers who were involved, different directors and so a new style of managing. […]

3.2 The planning of a career: playing with men's rules, adaptive behaviour and survival strategies

LS works as a programme manager in a medium size Irish company. She worked as an engineer first and then as a project leader, leading at one time up to 40 people. On the verge of 40, L has achieved one of the highest managerial levels in her company.

Her story is the story of woman with a strong technical background who entered the Irish software industry before the booming time of the mid-1990s, and therefore when women's presence in the sector was unusual. As she recalls, the first company in which she worked had around 30 employees and only 2 of them were women.

This 'structural' condition had a meaningful impact on the way L approached her career. At the same time, the narrative of her work story - from a company to another, from a job position to another- betrays rather conscious personal preferences and choices that activated different resources and strategies. The most important detour of her career occurred however in coincidence of the birth of her child and, more precisely, when she found out that he needed a certain therapy.

After her first irrelevant job that lasted for 3 years, L moves to a company that marked her consequent career steps. In a dynamic and technically advanced environment, L discovers the passion for her work. The company was the first one in Ireland to develop C++ and L was one of the developers; in addition, the company shipped another product that had also an innovative edge. Despite the disorganisation, L found that life in the company was extremely fascinating. The company was eventually taken over but L was not worried. As she recalls:

> We weren't concerned really about the job at that stage; we were all young, no mortgage, no children, no worries. We were just happy to be kept together as a group. […] We were quite cocky about it: we were skilled, we were good, we had no problem in getting a new job, and in fact a lot of people didn't have any problem to get a new job when they started to drop off. At the end there was a kind of a big joke.

L was aware of being in a male dominated environment. Although not hostile, workplace relations occurred into a male dominated cultural context, embedded into male cultural values. This urged L's redefinition of her positionality. As she tells, she assumed men behaviour that affected also the way in which her choice were made. As she recalls:

> You need to compete. When you go in somewhere you have to have your first success before they start taking you seriously and your first success is always you being right and the others being wrong. It is an element to prove yourself, you arrive in a company and you start working on the project and until you get to a position where- there is always a dominant guy on the team- and until he's wrong and you are right, you'll never be respected. Once you have done that once hardly, you will be asked again.

L changed job and joined another company that she did not like from the very beginning. The organisation of work and its management were the crux of the problem. Disagreements on a

particular project were the motivation behind L's early departure from the company. However, as she mentioned, the reasons were various, and among these, the lack of the competitive atmosphere that she got to love in her previous job:

> I was living faraway, the atmosphere in the company, the people, I had been on the edge for long time, so just surviving and I felt that the senior manager did not know what the guys wanted, so it was all those things.

In the new company, she found again was she was looking for. In her words:

> When I went to [the company for which she developed a programme] I went in with the attitude that I was going to make it work, it was a very successful project. The head of the technical direction […] would be responsible for looking at new technologies and to investigate this or that. He had what I called the hobby group to do a little project analysing in this group. He was great and the people around were great, and we worked on things that nobody had worked on before.

But again she had to prove her competence that was not being acknowledged precisely because of her gender. Speaking about one of her colleagues at the time:

> I worked with an engineer who wasn't just very kind and he knew it all and we had many fights. I guess he was ok, but he was a funny guy, he was a bit mean, nobody really liked him because he was very ambitious, so he came in to make his mark. […] I think, after 6-8 months he learnt how to respect me because I did more than him, I was more experienced and there was a huge amount of stuff that he could learn from me. […] It didn't work out like that because I worked very hard, because I stayed there long hours, I liked the work and I was never leaving before 8 o'clock in the evening, from 10 o'clock in the morning, everyday.

L left the company for no other reason than the fact that a cycle of research and application was concluded. In her words, work had become very much a life style. The definition of her identity included late working hours and socialisation over a drink.

When she joined her current company, she assumed a managerial role. Nonetheless, things were about to change. The decision to have a child put L in a new situation. The male environment with which she had learnt to come to terms and to control using the same tools showed its lack of support. While pregnant, she carried on working the same amount of hours conscious that her slowing down would not been accepted. She went on maternity leave at the time in which the new product on which her team had worked was in its final steps. The importance of her private life was as great as the care for her job. It is interesting at this stage to let L tell her feelings during this period and the strategy she adopted to maintain her career achievements:

> When I went to maternity leave, I was paranoid: I had built the product from nothing and it was my baby as well. I organised for the manager that I knew and I said I wanted to go back to it [the job] after the maternity leave, rather than come back and other stuff.
>
> The one who worked for me, he didn't really want to do it, but he did it. He said that he was taking the job for the period when I was in maternity leave and then I would take over once back. I set him up and I told him what to do when I was gone.

3.3 A broken career in the IT sector: accidental entry and conscious exit

TB is an Irish woman who entered the IT sector nearly 10 years ago. Hers is a story of a woman who did not choose to enter the industry. Her educational background and personal attitudes were ones that would be incompatible with the IT sector.

By a series of accidental events, she got her first job in the industry and then moved twice. In each company, T consciously realises the cost of being in an environment she was not attracted by and, ultimately, she disliked. T has recently decided to leave the sector.

T has a degree in English and history. As she recalls, she participated in computer classes that she never liked. At home, his brother's passion for computer was balanced by her interest in books and music. After college, she did a computer course for a year but:

> I was put down that I wasn't very good at math, because you have to have functions and all this sort of things to be able to program.
> […] at that time people were only interested in teaching how to program, and I had no interested in how to program.

As many graduates searching for the first job, she encounters difficulties. However, her brother worked for a small company that had a contract with an Irish bank and offered her to join the company. T's first encounter with the IT sector was accidental. The content of the job was not technical; the project she worked on consisted of replacing old back-office hardware with new computers; her brother and another guy were in charge of fixing and testing the system. Also the second project she carried out for the company had no technical content. T became project administrator but her work consisted of dealing with clients. However, this time, her narrative betrays the feeling of segregation with concern to the opportunities of learning:

> I wasn't actually dealing with the tech side of it, which I did complain about. I thought that would have been sexist because they would send the guys to a course in IBM and I got really pissed off about that and they knew more about that than me. But part of the reason was they could train me up to do the job that the other guys were doing, the guys I was working with, they couldn't train them how to talk to people on the phone or schedule meetings.

With no future prospect and without codified technical knowledge, T accepted a friend's suggestion to apply to another company as a technical writer. In that period, the industry was booming and the company was expanding. As she recalls, the company was "hiring people continuously, they had 3 or 4 new people starting every week for the first three months". This circumstance favoured T who got the job in the company as a technical writer but "not the other job [more managerial and administrative] because I didn't know anything about computers at all when I left college, no experience at all". Her initial confidence about her abilities clashes with the predominantly male environment, although her department saw a fair presence of women, as she carries on remembering:

> I certainly knew a lot about network and protocol how physically set up networks and I was very confident about my knowledge of hardware and how PC works. […] Once I got into [the name of the company] if you were looking for promotion, you had to pretend you knew more you really did. At the beginning I was not faking. At the beginning it's normal to ask questions, but after 6 months you are supposed to know what you are talking about, so you stop asking. When people asked me to do something I used to say "ok, no problem" even though I had no clue about what they were talking about. So that was difficult.
>
> If you are woman in an all woman environment and you talk about computers it's easier to admit, "I don't know what you are talking about", but if you are a woman and you around men you have to pretend you know everything otherwise they make fun of you.

The company was not the neutral environment, as often assumed. All scripts had to go through an editorial phase and then they had to be sent to an IT consultant to be verified. The IT consultants were mostly men in the programming area. As T explains:

> Writers are less important than the IT consultants, despite the fact that many of the writers knew as much as the subject as the IT consultants did, and they certainly in a lot of cases worked a lot harder than the IT consultant. I think there was this fear in the company that if they gave writers a greater sense of importance, and if there were given the same sort of responsibilities of an IT consultants have they would want to be paid the same.

T's difficulty in coping with her work environment was one of the aspects that made her career path complex. The specific nature of the work in the IT industry needs also to be considered.

> In IT business you have to keep update your subject all the time, re-training constantly, to keep informed of what is happening and I think you can really do that if you have any interest. There are only two ways you can do that: one is to be really interested and the other one is if you have a real financial incentive, like if you don't pass this course you'll loose your job. I have neither of these so I have no idea of what's going on in the IT world.

Blessed by the favourable circumstances of the Irish software company, T's story epitomises the story of many Irish women who entered the industry with 'soft' competences and low personal inclination and soon faced the difficulty of coping with gendered organisations of work, where 'heavy' technical skills were considered central credentials for climbing the career ladder.

Other stories however display completely different trajectories. LC had no technical background but she had an interest in computers. This allowed her to overcome the obstacles posed by a male environment. An intensive, often self-paid, training in basic software programming languages helped LC in her work as a technical writer. It also helped her to be accepted by the men in her company as a technical competent person. As she recalls:

> I realised when I started doing this project "oh I am good at doing this!" I remember it because we had curriculum planners, who were sort of subject matter experts, the technical experts, who looked at me with this surprised air: "the writer understands all the stuff!"

Also LC however felt the implications of being in a very male dominated department of the company. As she reports:

> There was a sense that he was "all the men together" and we were this kind of curious little creatures. There was among the small group of women in the department, the feeling that we weren't respected quite as much as the men. We had to work harder. […] Also I wasn't absolutely definite about all of this, but myself and some of the other women employees who left … kind got the impression that the initial salary given to women was lower. […] When I said that the department was very male dominated, I mean that there was a particular group amongst the men in the department who were very into "football and pints" … so you did feel quite occasionally that you were in a male locker room.

4 Education

For a minority of people interviewed, the choice to do a computer or a science course at school depended on personal inclinations and a great sense of personal achievement. As explained:

> In school I was always towards the science rather than the economic or business studies. That was my personal inclination, I always felt that the science subject were more definite, I enjoyed them

> more, I felt that if you study things like economics, business, they would lead you towards more accountancy, and I was not interested in that. That was really my thinking (LS).

And:

> I graduated in electrical engineering in university 4 years. I loved maths. Nobody influenced me in taking this faculty. My father was a teacher and he really didn't care about the faculty as long as I got an education. It was a personal choice. I had great ambitious like a teen-ager. Yes, I wanted to be somebody, make a lot of money, people would have respect for, but I was 15 (MP).

In the vast majority of cases, the choice of a scientific discipline and, especially, of computer science, was influenced by adults who realised about the job opportunities that the IT could offer in Ireland in the mid-1990s. The following quotations are exemplary of this situation:

> So there was Information technology, but I said "computers, I cannot do it" but people in College, said "don't worry, you will learn". The head of development, the guy who was kind of organise, he was Irish, he said when we arrived "this is the way economy is growing, it is a really good degree" it was in 97. He was head of development in college so he would help the relationship between the industries and of the colleges, so I said ok. I looked at the prospects, the courses involved it wouldn't be a computer program, but how computers are used in business more applications, so, I did that (GA).

And:

> Purely, when I went to College this one year for this computer course, was known to be a good practical way to get a job and everybody knew that a lot of the class of the last year, all 30 of them they got employed within 2 months (EP).

From the interviews in Ireland, it appears clear that the main positive or negative influence in orienting the choices of young girls towards technical disciplines was played by teachers at school. As explained below:

> I did computer science in College and before that I did when I was in school I did an O level in computer science. […] I think it was the math teacher that I had at the time, who was doing some computer work for herself and some computer studying herself and she influenced some of us to take it (AC).

Or:

> My professors suggested me doing more technical things (RB).

And also:

> It was a girl school with nuns. […] I passed math for my leaving cert**,** but there were always problems, because the nuns would not allow the majority of us to do math. They said it was too difficult. They just had this theory of everyone failing (IOD).

The interviews suggest also that for many of the women who entered the industry a key role was played by the familiarity with a computer at home or at school: the computer used to play or simply as the object that brothers or fathers would use for their work. The following is an example:

> My dad was in the military so I had a computer in my house since I remember. We've always had one, like a Commodore 64, the old computers. My dad was in the military in electronics, so he used to work in a room with the computers, so I grew up in computer I could say, I've always had them around me (SP).

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Italy: Biographical Interviews – Final Report

1. Selection and main characteristics of the informants

Here are the general characteristics and short description of the 20 people interviewed.

Tab.1 Main characteristics of the interviewees

CODE.	Loc	Job and degree	Short description	Age	Children
BIOIF01	South	Digital graphic designer High school diploma in arts	She has a very positive approach to work, she adapted herself to medium-low professional level and very low wage. Anyhow, she is especially satisfied with the creative part of her job. She has often tried and she would like to have in future, an independent job. Since she is very tired about the workload and the caring of her family, she would prefer to have a part time job or to work from home.	29	1
BIOIF02	South	E-teacher in computer sciences Graduated in political science	She is a positive person who did not have enough opportunities to deploy her potential and expectations, especially for her living in South of Italy. She had a contradictory educational path, since she made the wrong choice in high school courses and became late aware of her inclination to ICT professions. At present she has a ICT job but not so creative as she liked.	31	0
BIOIF03	South	SW developer Graduated in computer engineering	She chose ICT career for optimise her opportunities of getting a job; however she is very fond of technical work. She is now frustrated for low salary, low consideration by her boss and for the "macho" environment of her present company. At present, she doesn't have career expectation, she would prefer a part – time job (at least for future when she will have children). In general she regrets not to have chosen a career as a teacher, like her mother.	30	0
BIOIM04	South	SW developer in Nokia Graduated in computer engineering	He has very good relationship with women either his university colleagues or work colleague or his girlfriend and he tends to underline their professional value and to mark their determinate and successful attitude. He is satisfied with his work which fulfils is learning attitude and is the right mix between technical tasks and relationship with customer. He wants to improve, to go ahead in his career but without becoming a "addicted to work". He dream is "to woke up at 4o and finding himself with a good and non stressing job, a good partner and some children.	28	0
BIOIF05	south	SW programmer and analyst Biology technician	Although a wrong starting point concerning the educational choice, she managed to develop all the career opportunities she ran into. She is satisfied about her successful position in the company and about her colleagues' esteem, unless the low wage. Anyway, she is worried about the coming of children, because the total availability required from her job and the lack of support by her husband.	28	0
BIOIM06	south	Radio frequency engineer Graduated in electronic	He looks a quiet and satisfied person, proud of his professional position and of his personal condition. He seems to have a rather	37	2

		engineering	traditional vision of male and female professional and social roles and he seems to be at ease in his role of "male breadwinner". He was a bit suspicious and hesitating during the interview and especially questions relating with family and gender roles seemed to embarrass him.		
BIOIF07	south	Unifase manager (SW electronics components) Graduated in computer science	He focused on an ICT career as a mean to be sure to get a job, in a situation in which it is not so easy. Actually he likes his job and especially his role of project manager and team coordinator. He is quite satisfied with working in a big company, but he complains not to be enough paid. He has a traditional attitude towards family roles and gender relationship and caring responsibilities.	32	1
BIOIF08	south	Data base analyst Degree in computer science	She is a positive and realistic young woman, she likes computer science and shi is rather satisfied for getting a well paid and stable job in a large company, although she'd like to work by herself. Being aware of difficulties and prejudices towards women, she is worried about the moment she will have children.	30	0
BIOIF09	south	Art Diploma Computer sales and customer care Degree in computer science and Post high school classes in computer programming and office automation (3 years)	She is very young and sensitive, she met technologies by means of her brother. She is now interested in her job, she likes seeing what is inside a computer, although she did different kind of studies. She in a way gave up to her creative ambitions since she did not up dated her skills in graphic arts. She defines herself as a bit lazy and about her future she does not seem to have a precise idea of what she is going to do. Her hope for the near future is to begin a new life with her boyfriend that is going to settle in Catania	25	0
BIOIF10	south	Visual, communication and graphic design Art diploma	She is almost an artist as for her life style and way of working. She often moved for work but she is very attached to her region Sicily. She is very independent but takes extreme care of the quality of her works (especially of the final client). She doesn't mind not gaining too much: she is more interested in appreciation from others.	45	0
BIOIF11	North	Project manager in SW Graduated in physic science	She describes her meeting with ICT and with her job as a result of lucky coincidences, but in fact she is a determinate and self reliant person. Although she is satisfied with her professional role, she has some regrets about having renounced to her passion for oriental languages and not having spent some time abroad during university years. She marks to have always been supported by her parents in her study and professional choice and also in her life concernments. She is quite satisfied with her job, bet she would like more spare time to dedicate to singing, that is her big passion.	29	0
BIOIF12	North	Software engineer in SW Graduated in foreign languages	She is a very positive and determinate person, she is found of ICT and she has left her city of birth to have more employment opportunity. She is attracted by new and is satisfied by her job as software engineer: she is the only woman in a group of 5 people, but she does not feel discriminated for her being a young and female worker. She describe working in ICT as a "brain	26	0

			working" in which there is no difference between men and women.		
BIOIM13	North	Web-master & web-designer (self-employed) Post-high school diploma in design (3 years)	He is a very skilled and passionate graphic artist, who was able to convert his profession to a digital one. Moreover he is a successful entrepreneur. He is very versatile and always willing to learn new techniques. He has a balanced relationship with his wife and a great esteem of women working in web jobs.	36	1
BIOIF14	North	Chief graphic designer High school diploma in graphic arts	She works as editorial graphic responsible in an important magazine addressing women. She reached this successful position due to her deep passion both in graphic and computer, although she did not attend specific training class. Unless an environment often competitive, she is a very positive person and she is very attentive to cooperating with people (specially with women) and to the quality of results. She was very energetic in facing the challenge of conciliating her job with the caring of two children, but recently she had to renounce to a good career opportunity because of her family responsibility.	44	2
BIOIF15	North	Web designer Post high school diploma in graphic design (2 years)	She has always been fond of art and communication and she moved from a traditional job in publishing as illustrator to computer art graphic. She is as well very much engaged with social work, informally teaching web design to other women or to anyone needs. She is a free lance and she tries to organise her work according to her child needs and to her inclination.	40	1
BIOIF16	North	Alliance manager in IT Graduated in computer science	She is a very serious and determinate woman, who chose to become an engineer twenty years ago when very few women applied to this kind of course, encouraged by her father and her brother, who is an engineer as well. At present, she is in a leading position, although she has two children: she has organised a very well structured network of familiar help (parents, parents in law and baby sitters). She is a very serious and determinate woman, who chose to become an engineer twenty years ago when very few women applied to this kind of course, encouraged by her father and her brother, who is an engineer as well. At present, she is in a leading position, although she has two children: she has organised a very well structured network of familiar help (parents, parents in law and baby sitters).	40	2
BIOIF17	North	Retail consultant in IT Graduated in computer science	Although she describes herself as a lazy and not organised person, she is a successful and competitive ICT professional. She seems to live in a constant *trade off*: she is proud for the professional position she gained by means of maths and technology, but she as well regrets not having dedicated enough time to her passion for creative activities. Anyway and she has managed to balance her work with her passion for embroidering and sewing and she has created a personal site dedicated to these kind of activities. According with her controversial and somehow contradicting attitude, she underlines feeling "an house wife in her soul" and during the whole interview, she marks to feel quite at easy in her role of mother.	40	2

BIOIM18	North	General manager in IT consultancy Graduated in mathematics	He is a very serious, intelligent and concrete person. He achieved a high position as a co-leader of a medium size undertaking, where a 40% of women work). He has a good opinion on women ("they have a broader vision of the reality and more intuition") but he says they have more difficulties in their career (he thinks they are obliged to be more aggressive). He doesn't forget when IBM searched only for male graduated and for this reason perhaps he has been a good mentor for a woman colleague (who is one among our interviewed).	46	3
BIOIF19	North	Product manager in IT Degree in computer science	She is a very brilliant and positive person, she likes doing different things and has a marked learning attitude in her working life. She I s attracted by new things and she thinks if a person wants to improve and also to get a satisfying wage, it is necessary to change often. She has a good relationship with technologies and she use computer also in everyday life. She is a very brilliant and positive person, she likes doing different things and has a marked learning attitude in her working life. She I s attracted by new things and she thinks if a person wants to improve and also to get a satisfying wage, it is necessary to change often. She has a good relationship with technologies and she use computer also in everyday life.	40	0
BIOIF20	North	Teacher in computer science Degree in mathematics	After working as project leader in an ICT company, she decided to become a teacher since she was fed up with the new economy environment and she intended to dedicate to her children and husband. She has a deep interest in maths and computer science and she is very curious of whatever is new. At the age of 40 she decided to start a new professional life choosing to become a teacher and she has no regrets for her choice. Although she says she wants a quiet life with her family, she let herself being involved in many new projects and in extra school work and she seems enthusiastic about it.	40	2

At first, we chose the people according to the distribution rules assigned by the Guidelines as for "*men/women"* and "*North/South"*: 8 women and 2 men in Northern Italy;7 women and 3 men in Southern.

We made 10 interviews in Milano and 10 in Catania (Sicilia), which is one of the most industrialised towns in Southern Italy and where a few Italian and transnational It companies have a subsidiary. In particular, in this province there is a big French company (STM Microelectronics, which counts up to 4500 employees) and three small-medium enterprises (SeaSoft, 150; Nokia Network, 40; Magneti Marelli, 30), all born very recently, after 1997.

In the North, we didn't any problem in finding women who have an ICT career path (we could actually choose between a number of different people we were informed about) and we had the impression this kind of jobs are very common among women who live in Milano. Differently, as we mention later on, we had more difficulties in Catania.

For what concerns the other variables involved, we have tried to collect interviews from people in different fields, who hold different *"jobs"* (Itc, IT and computer services, e-publishing, Web jobs, etc.) and who occupy different positions. At the end, the following outcome could be seen:

- 10 in SW jobs
- 5 in Web jobs
- 1 in HW jobs
- 1 in radio frequency engineering
- 1 in electronic components
- 2 teacher in internet & computer science

Regarding to the *"degree"*, we tried to have among our interviewees both high-school diplomas and university degrees. So we have collected:

- 4 high-school diplomas
- 3 post high-school diplomas
- 13 University degrees

What we can observe now is that in some cases – both in Southern and Northern Italy - diplomas and degrees appear un-appropriate for an Itc job: political science, physic science, foreign languages, etc.

As for *"age"*, the main problem we found to have a range of different ages among our interviewees is due to the fact that in Southern Italy the Ict professions have spread only in the last Nineties, so we have found younger workers than we have in Milano (and, by consequence, less women married/mothers).

- in the South, an average age of 32 (30, if you exclude the one over 40)
- in the North, an average age of 38

Considering the *"children"* factor, we made every effort possible to find women who had a family and children, in order to be able to better investigate the problems linked to the attempt of reconcile work and family responsibilities. Unfortunately, even our interviews show that Italy is the last country in Europe as for birth-rate: in the South (where the women were younger), we could scarcely find one woman working in Ict sector who had a child![9] On the contrary, in the North we succeeded in finding a pretty good number of mothers and fathers (8 out of 10). All men interviewed, except one, have children.

2 Biographical Patterns (and career patterns)

After analysing our interviews and reflecting upon different self-visions the women expressed through the story of their lives and upon various approaches women used to describe their trajectories, we could build an hypothesis about the existence of some recurrent different patterns of career.

[9] [9] This data is un-coherent with statistics who show how birth rate is higher in the South, even if it is decreasing.

Choosing security

The most evident characterisation of this biographical pattern is a rather realistic relationship with work, mainly seen as just one of the sides of your own life. Two different types of career path can be recognised. The first type corresponds to a very general aptitude to get a secure job, possibly in a big company, whose main characteristics are: a linear, bureaucratic, internal career path and the opportunity of a good balance between work and extra-work activities. The second one – we could name it an "opportunistic" career - seems to be a very typical trajectory for people from Catania: in recent years this town of Sicily - where finding a job is still a difficult matter – was addressed with many public investments and incentives in new technologies in order to overcome the technological gap exiting between northern and southern part of Italy. So, addressing her/his own education to Engineering and Computer Science is seen by young people as the most reasonable way to optimize the opportunities to get a job, even independently from personal orientation and interest. Nevertheless, in biographies we collected, interest in technology is often genuine. People in this pattern may be so successful and satisfied workers as workers having other type of career.

A pretty number (seven on twenty) of our informants have more or less these biographical and career characteristics, obviously more in Catania than in Milano. Three on our five male informants (and the whole group of southern men) are in the "choosing security" pattern. Parents and background do not appear to be so much influent.

BIOIF16 and BIOF03 and are the most interesting narratives in this pattern.

Forty years old, Milanese, BIOIF16 (Alessandra) is a very serious and determinate woman, who chose to become an engineer twenty years ago when very few women applied to this kind of course, encouraged by her father and especially by her brother, who is an engineer as well. At present, she is in a leading position in her company – one of the biggest SW company in the world – where she has been working since the beginning of her career. She has two children and she has organised a very well structured network of familiar help (parents, parents in law and baby sitters).

> "I come from a very traditional family, father entrepreneur, mother housewife and a brother eight years older than me. I was born and I have always lived in Milan. When I was a little child my father worked a lot, but he always find some spare time for me, it could be during the Sunday, to take me out, I've always been his 'little daughter'. And now his is a tender grandfather with my children…"
>
> "I attended scientific schools, following the path of my brother, who graduated in engineering, as it was family style to take a degree at a scientific high school. At University I chose Electronic Engineering, I loved all scientific subjects and engineering seemed a good compromise: a lot of theory but also many practices, I was very interested and curious. In the end I took a degree in Industrial technology engineer, at that time the market was very dynamic, so I was taken on in Digital, a big company spread all over Europe, similar to IBM, but smaller…I was a product manager, those people that in Digital deal with disk, record, Pc etc."
>
> "When I had my second child, I decided 'to take it more easy': I stayed at home for one year and came back at work just for 6 hours a day. My boss helped me in gaining this part-time work, but also proposed me to change my job. I have to say I'm a bit resistant to change and at the beginning I did not intend to accept my boss offer. Anyway he is a very smart person and he managed to persuade me that I would be able to manage the changing without too much stress. So I started dealing with marketing issues…Everything was ok, but the Digital was acquired by Compaq, in 1999. I became the alliance manager dealing with relationship

> between Compaq and Microsoft. In 2000 Compaq was acquired by HP and now I'm doing the same job here in HP…"
>
> "I'm really lucky as far as family organisation is concerned: my mother in law lives downstairs, my parents live very close to me and all of them are available to take children at the swimming pool, for example. So I feel very calm because I know I can always trust on them. Around 7 o'clock in the evening I'm back home and my husband too has not such shocking working time, so we have time to dedicate to our children…Sometime I travel for work, but not so often."

BIOF03 (Annamaria) is a young engineer as well. She was born in a small town near Catania. She thinks she has had many successes in her life:

> "I had a lot of successes in my life: taking a degree, joining a band, I used to sing and they congratulated with me, I have had my satisfactions, I went away for working and I was happy."

Anyway, differently form BIOIF16, who is running a successful career, at present BIOIF03 is not so happy with her job and she is rather frustrated for low salary, for low consideration by her boss and for the "macho" environment of her present company. She started working in a large company in Rome but after two years she decided to come back to Sicily, where she now works in a large mobile telephone company as Test Specialist. Although she is very fond of technical work, she says the prevailing reason for choosing an ICT career was to be sure to get a job.

> "I have a degree in computer science and an high school diploma as computer industrial technician. I chose this school because I was already concerning about my future, in fact I did not intend to attend university (in this case I would probably have done a different choice). I thought I would look for a job immediately after the diploma and a good school to find a job."
>
> "I take after my mother: dynamic, open, interested in a lot of thing. My father is more calm, like my brother, with a life regulated by precise patterns. My mother is a primary school teacher, my father a teacher of literature… "

At present, after a few years negative experience in this company, she doesn't have career expectation any more and since she is now getting married, she is looking for a part–time arrangement, because she considers her present job not being compatible with having children….

> "Concerning my job, I don't have great expectations, since I've realised I do not have so many opportunities of career. So I'm focusing on other things such as my family, my house, my children… I try to do a good work, but that's all, I'm no longer interested in career… Concerning my future, I hope not to be involved in a too much stressing job, which will force me to travel. I wish I had a part-time work to dedicate to free time and to my future family. I think I will have big difficulties to get a part time job with the company I'm working for, so my hope is that it will introduce part-time. I even thought to change my job.."

In general she regrets not to have chosen a career as a teacher, like her mother:

> "I did not choose to be a the teacher because it would have been a pity, after so many years studying engineering… But now I say 'why haven't I done the teacher?' I would have had free afternoons...When you have a family how do you manage to work on the afternoon and to dedicate to your children? Instead when you are a teacher you can spend half a day every day with your children. It is such a big regret: if I could start again, I would teach…".

For many aspects, another woman (BIOIF12 - Valentina) can be placed in this biographical pattern. BIOIF12 is a very positive and determinate person, she is fond of ICT and she has left her city of birth to have more employment opportunity.

> "My family come from Naples, I have a brother who is older than me and a younger sister…I attended foreign languages University course, because at that time everybody spoke a lot of European Community and it seemed me useful to learn languages. While I was attending University, I started an evening course of Microsoft certification as well: I decided to learn computer science because I was afraid languages wound not be enough to find a job… Computer and languages: it seemed me a good combination…"

> "I looked for a job in Milan, because there we have some friends who could help me; I looked in Internet and I sent my curriculum vitae to four or five companies, to be honest without following a precise pattern, and one company called me in the same day… I started working soon in an IT company, that sent me to a customer and the customer hired me. I've been doing C; C++ programming…"

BIOIF12 is a brilliant person, she is attracted by new and is satisfied by her job as software engineer. Anyway, it is rather surprising what importance she gives to job-security:

> "I am satisfied because I have an open ended contract, I'm in a "strong" position and there should be very serious reasons to fire me., the company would face problems with trade unions…I'm a full time worker, I earn enough money, I manage to live in Milan, I have a good work, sometimes I work a lot, anyway they always pay us for extra-work…and I also have free time to spend. Moreover, I have already had some progress in my career: after one year I asked to have a promotion and they soon gave me, they gave me a higher wage without any question.

> "I had many satisfaction, because at the beginning I only deal with simple tasks, then more and more difficult ones. Sometimes I was afraid not to manage them, but their giving me the responsibility for such tasks made me in a good mood, encouraged me to learn, to do well also 'asking how' to some colleagues".

She is the only woman in a group of 5 people, but she does not feel discriminated for her being a young and female worker. She describes working in ICT as a "brain working" in which there is no difference between men and women

Another Sicilian biography underlines the importance that some people give to choosing the 'right' type of education and to having the 'right' type of job. BIOIF08 (Rossella C) works as data-base analyst and software developer in the R&D department of a large electronic company.

> "I attended a scientific high school and then I took a degree in Computer Science, because I was fond of computer and Mathematics. .. I think education is essential not only to find a job - which depends on what kind of job you want - but also because when you are well-educated you are more appreciated than those who aren't… As far as I am concerned, my degree gave me more opportunity to get employed"

She likes computer science and she is rather satisfied about her well paid and stable job in a large company. Sometimes she regrets not having a more flexible and independent free-lance activity, but:

> "…when you gain a secure job and a good salary, it might be rather risky to go around looking for free-lance collaborations, moreover without any guarantee to be enough paid…. Some people do this as a secondary job, but for a woman it is really unconceivable…, how could you manage when you have a family!"

Risk for success

At least five of our interviewees – one man and four women - can be classified in this biographical pattern. Some recurrent issues in their biographies are: having very encouraging parents; having coherent degrees, living in a large business city, working in a competitive environment, having a lot of professional mobility.

The four women trajectories are so similar that we could name this pattern "Milanese women in It professions", because it is very typically widespread in software and publishing activities and reflects the peculiar style of high qualified women living in Milan (probably, as well as in other big business cities in the world). Unless most of them work long hours and travel frequently, all of them say to be quite satisfied of their job.

This pattern refers often to very successful careers, although they do not seem to be long-lasting careers for women: one of our informants (BIOIF19) recently turned to part-time work, another one (BIOIF14) is now slow-downing her career due to familiar constraints and a third case decided to give up and now she works as a teacher (BIOIF20).

BIOIF19 (Manuela) is a good example of this kind of aptitude. She is forty years old and she works as product manager in an IT company specialised in software for health sector. She is a very brilliant and self-determining woman, with a marked learning orientation in her working life. She is an eclectic person, always attracted by new things and she thinks if a person wants to improve and also to get a satisfying wage, it is necessary to change often ("if you change you, gain"). She has a good relationship with technologies and she use computer also in everyday life. She is sometime aggressive which caused some problems with bosses and colleagues, anyway she is a very intelligent and self-reliant person.

> "I come from a very particular family: both my parents are self-employed. My mother has a leather shop that she opened when she was 26 years old, lending money from her uncle. She goes on managing the shop by herself, she will never give it up. Now she is 71 and we hardly managed to convince her to close on Monday.. my father has a building company where he is still working, he is 76. when he was young he made poster, he was very good at drawing, then his father made him to work in his company, and he did so, anyway he was happy. Concerning life decisions, my parents always let us free to choose, they never forced us, they trusted in us and enabled us to come and study here in Milan, from Turin, and Milan is an expensive city.. The strongest message came certainly from our mother: she has always told us to find a job, to be independent, since you never can tell.. And these were not just words: she really did what she told in her life"
>
> "I chose computer science because it was new, it sounds interesting. I thought I could have attended mathematics or another scientific university, in case I did not like computer science"
>
> "After the degree I decided to stay in Milan, countryside did not offer so much. I worked for about six months in University, but without wage, then I wanted to earn some money and to be independent from my family, so I started working in a small company. I did programming and software development, as it was natural with a degree in computer science. Everything was done well, I liked so much that way of programming. I worked a lot and I learned so many things!"
>
> "Then the company closed, two partners took the software product and brought it in another company operating in the health sector, in order to offer it to other organisations in the public sector. They asked me to follow them and since I got along well with them, I did so… Then, after 4 years, when one of the two partners told me he was leaving, I caught the opportunity and I left as well. Four years had passed and it was time to change…. "

After many years spent in this focused and very mobile career path (seven moves in fifteen years!), BIOIF19 experienced an interesting turning point: she shifted into a part-time job – she now works only on Monday, Tuesday and Wednesday – in order to develop her new "hobby" into a real business. She faced this new experiences with the same strong entrepreneurial spirit.

> "(The last one) had been such a stressing experience, at the end I was really tired and I wanted to change. In addition I wanted to spend more time with my family and I had started a new activity I liked very much: I make jewellery design and realisation using things coming from my travels around the world, stones, wood, iron. I'm very satisfied with my new art and crafts activity: I registered a name 'Manuganda' and published some pictures of my jewels on newspaper; I also contacted a shop which will sell them. You can either do things well or do not do things…"

In spite of this change to part-time work, she keeps a good managerial role and a good salary in the IT company and she thinks she loves too much this job to leave it. In future, she could work as free-lance consultant.

The career path of another Milanese woman, BIOIF14 (Laura), is very dynamic too. She is 44 and works as editorial graphic responsible in an important magazine addressing women. She reached this successful position due to her deep passion both in graphic and computer, although she did not attend specific training classes. Although an environment often competitive – such as the journalists' one - she is a very positive person and she is very attentive to cooperating with people (specially with women) and to the quality of results.

> "I started working in 1976, that were the year of the "intellectual unemployment", I wanted to be independent and to leave my home but my father had his own office of graphic art and he wanted me to work with him. I could not decide between being a journalist or graphic artist, so I did both the two things: I worked half a day with my father and the rest in a newspaper... My father taught me to draw, to write, at that time we still used paint and pencil, after a while, thanks to him I was employed in a newspaper. "

> "I worked with Renzo Castiglioni (a famous art director) who was like a second father for me: he helped me, he taught me a lot of things and when he went to work in Mondadori (one of the biggest publishing company in Italy) he wanted me to follow him. I was there for 12 years, the newspaper worked well, we had good director, we were 4-5 graphic artists, we worked hard but it was so good. I was also free to manage my time in autonomy: I used to go on holyday when I decided to, so I make a lot wonderful trips, which are my passion. That were nice years, there were a lot of things to do, music theatre, [...]. It was really a nice period of my life, I had a lot of fun".

She met new technologies when they started to be used in the editorial office of the newspaper:

> "The spread of new technologies help me a lot, it gave me more opportunity, it was funny, before it I was a bit fed up with everything, fed up with work, with Milan, I thought about my way to escape… Suddenly, everything changed completely: the way of working, the relationship among different professions etc. and I became enthusiastic again… This was happening when I came back from maternal leave. I started using PC, fortunately I learnt quickly, I liked using it, I had a free mind, I wanted to be back at work and to pick up new things. I in about a month I reached the same level of my colleagues.. I think that women manage better to adapt to the new way of working, perhaps because they are more open-minded, curious, available than men…"

> "I think that working with other women is nice: the relationship is more true. I really like working in a newspaper, seeing it growing, working in a team. I could never work alone, I'm used relating with colleagues and a team leader. .."

BIOIF14 is very energetic in facing the challenge of conciliating her job with the caring of two children. Although at present she has set aside the good career opportunity to follow her boss in Rome because of her family responsibility, she has not renounced to her project definitely.

> "At home I was quite well organised between nursery and baby sitter, although my second child suffered more than the first in "leaving me", Unfortunately if you work and have children there is a bill you have to pay, you have less time to spend with them, you have to be well organised, but I like my job and I have always tried to explain this to my children. Anyway, in newspaper is very difficult to have part-time job, you have to be present. If you really want more freedom you have to resign and to turn to free-lance work, but not all the bosses let you this chance, especially when you work for a weekly magazine."

> "As for the future, I don't know… I did not give up the idea of going to Rome, but now it is really difficult, the new graphic project of the magazine (Espresso) has already started and I should wait for somebody's retirement…"

Also the story of BIOIF20 (Maria) is a story of hard working, good career development and satisfaction until a few years ago she decided to break her career as IT professional to turn to a less stressful job as a teacher in high school.

She had a strong commitment to study and to become independent from her family

> "My parents always regret not having a good culture and education, so they encouraged all of us to study. We could choice what we preferred, but we have to study, absolutely! And we did so, we are all graduate, only one of us works in the company of father, who some years ago became self-employed…Moreover, my parent in Calabria were in a rather good situation, they ware landowner, and it was just for us that they decided to leave, in order to provide us a good education and to enlarge our life chances."

She had a deep interest in maths and computer science and she is very curious of whatever is new.

> "I started working in NCR and I stayed there till 2002, I've been there for fourteen years, I occupied different positions and been involved in different projects. I started as programmer, then I became analyst and programmer in a branch of the company that dealt with financial software. I felt at ease, the climate was very good, it was a young company that was enhancing its activity."

> "I worked in the area of the company addressing finance, when I had my first child…. When I came back, a woman had become my boss; she went along well with me and she offered me to join a new project team on electronic payment. It was very interesting from a technical point of view. I worked there about one year and a half, when I had my second child…"

From the birth of her second child on, BIOIF20 starter meeting difficulties in balancing her family needs with the full and demanding working activity, so she tried to turn to part-time work.

> "I succeeded in obtaining a six hours part-time, but unfortunately it was just for a short period. When I came back I found some changes, the company had decided to move my project to another division… and I had no choice: I had to begin again!...Anyway I never had problems with changing. After a while the project leader went on maternity leave and I became the project leader myself".

When the project was over, she worked for one year and a half at a client as a project manager. Meanwhile a lot of things were changed in the company, there wasn't team spirit anymore, there was a lot of competition

> "We had that ugly period of the passage to euro: I remember a December and a January spent on working and even the New Year day. And not a reward… I was fed up with having to be aggressive and fighting to obtain any single thing! There wasn't any team feeling anymore, too much competition, and constant arguments between colleagues. I was really sick of it, by that time: Besides, I was really working too much… "

Then, BIOIF20, at the age of 40, decided to start a new professional life

> "I decide to try and apply for a teacher's place…now I teach Computer sciences in a technical institute… My life has radically changed, I feel like I were constantly on vacation, the school where I teach is not far from here, and close to my children's one. They are now one in first and one in third grade…I can go and pick them up, I can spend my afternoon with them, I can do at home most of my work, such as grading papers and prepare for class…"

She has no regrets for her choice. She says she wants a quiet life with her family but, in fact, she let herself being involved in many new projects and in extra school work and she seems enthusiastic about it.

By chance

This biographical pattern corresponds to a very open-mind aptitude. There are some recurrent characteristics like having very supportive parents and experiencing very casual turning points of career. Women in this kind of trajectories often show to enjoy very much what they do and describe themselves as very lucky people.

BIOIF09 (Rossella S.) works as technical assistant in a computer shop. She is very young and sensitive. She studied Arts.

> "I live with my parents and I have two older brothers: one, Giuseppe, is my boss, the other works in Navy. My mother has a small shop, my father retired. Things I'm doing now, in a sense take after my mother's activity: sales and customer care. I've always had a very good relationship with my mother, less good with my father because of his more rigid attitude. They let me a lot of freedom and they still do... I think I take after both of they, I take after my mother for my being extrovert and my father for my being obstinate. I've always gone along well with Giuseppe."

> "I attended the public School of Art, my expertises were graphic art for advertisement and photography, because I like drawing. I liked this school very much and I had a lot of fun, although it do not provide you with sufficient skills to face the labour market: we worked with forty-year old techniques and obsolete tools… we used computer only one or two days per month, three people for each PC: it was unbelievable! Once out of the school I should have go on with computer-based graphic art, which I didn't because I was not so interested in graphic matters and because I am a bit lazy as far as studying is concerned.."

She met technologies joining her brother business activity.

> "I started working when I was nineteen, immediately after my degree, I worked with a friend of mine who was a photographer, I've been working with him for about seven-eight months, I did "pocket photos" and dealt with customer relationship, but it was not that interesting…"

> "Then I entered the computer sector, where I'm still now. It was my brother who offered me the occasion, since he was working for a company from the North of Italy, he deals with the storage. I started answering the phone… That time, I managed only to switch on and off the computer…Now I deal with assembling the PC, thank to my teacher (referring to her brother),

> and with installing it. I follow the customer from the selling of the PC, you have to suggest him something fitting his needs. Then, I assemble the machine and I delivery it. Sometimes, I also deal with technical service. We sell both hardware and software, updated releases, etc. The most important thing in my job is to understand which kind of person you are dealing with. This is essential and it is also very interesting and nice for me. People often do not understand much about computers, so they ask you silly and absurd questions… in some other cases you meet young people who know more than you and make you become crazy… you have to face with different kind of customers."

Although she could not follow the original path opened by her education in graphic arts, she is now interested in her job.

> "Now assembling a Pc is an art, at the beginning I did not know what to do with all these cards, cables.. then when you start understanding what there is inside a computer, you start loving it and what at the beginning seems you a terrible mess you can do easily and it very nice what you can find inside a PC.."

BIOIF09 is the kind of person who welcomes what life is offering her:

> "I think I'm a lucky person because I like this work, which encourage me to improve, unfortunately due to the situation here in the South of Italy sometimes you have to do works you would never choose, but you have to adapt, but fortunately I like my job. I feel appreciate especially by some customers, because it is unusual to see a girl behind the counter of the assembler, handing a screwdriver. Here in the office I feel perfectly integrated, I occupy the desk of my colleague, you find my things everywhere (including pictures of my little nephews and the aquarium of turtles..).

She defines herself as a bit lazy and about her future she does not seem to have a precise idea of what she is going to do. Her hope for the near future is to begin a new life with her boyfriend that is going to settle in Catania

Different trajectory but same spirit characterises the biography of BIOIF11 (Patrizia). She is a very young woman working in the medical branch of a big electronic company and she deals with a special telemedicine project providing ICT-assisted home care to people suffering for chronic diseases. She marks to have always been supported by her parents in her study and professional choice and also in her life concernments.

> "I'm a only child, I've always lived in Milan and I never had problems at school, I've always liked studying. I've two young parents who trust in me, always helping me in difficult situations. My parents are really special, they always let me free to make my choice."

> "I attended physics and I soon realised it was not such an easy matter, I even thought to give up, sometimes. Most of the students were male, I had a lot of male colleagues, but I go along well with them."

She describes her meeting with ICT and with her job as a result of lucky coincidences, but in fact she is a determinate and self-reliant person.

> "When I finished I wanted immediately to start working, but I did not have a precise idea of what to do. So I decide to take more time to choose and started a master class find out by chance on a newspaper. It was a good occasion to go out from the usual world. The master class consisted also of a practice in a company. Again fortune decided on account of me… None of the companies they proposed me sounds interesting, not guarantee me a job after the stage. Again the newspaper helped me… I happened to read about Siemens medical care looking for physicians. There were two opportunities: the first was more similar to what I had done till that moment, the other completely new, related to new technologies. The curiosity to experiment something new won, so I started working for the Cancer Care Institute of Milan, at

> the radiotherapy area. My task was to contribute to a study on a new telemedicine system. It was a very interesting, although sometime shocking, experience.

Although she is satisfied with her professional role, she has some regrets about having renounced to her passion for oriental languages and not having spent some time abroad during university years. She would like more spare time to dedicate to singing, that is her big passion.

> "Now I work in Siemens, the working time is a bit stressing, I'd like to dedicate to something else, after work. Working is important but I am not that kind of person that lives for working."

BIOIF11 is still open to cope with further change in her life:

> "I consider me to be lucky for dealing with innovative subject matters, for not doing a routine job and for being in a big company. Now this is ok for me, but if it happened me to change, I would probably do something completely different… "

It is partly similar to BIOIF09 the story of BIOIF05 (Daniela), who got a diploma as biology technician, but works as programmer and software developer for a computer service company. She lives in Catania, she is 28 and she is married. As for all the biographies in this pattern, for BIOIF05 the support of parents was a crucial factor in order to develop a positive and free attitude toward life events and work chance.

> "My parents always supported me, they have gone with me in my study path and let me do what I wanted. My mother is a bit fragile, I take after my father. They have trusted in me, which made me liable."

> "I have a degree as technician of chemical laboratory, which has not much to do with my job. I attended biology science at university till the fourth year, then I gave up since I couldn't see any professional way out: there were so many of my colleagues without a job, most of them gaining just unstable little work."

In order to react to difficulties in finding a job and giving the fact she was already able to programme ("I programme since I was 10 because my father had bought me a computer") she decided to attend at computer courses ("I did a course of Pascal one of C language and then a course in Office Automation"). Then while she was doing her two-years apprenticeship at the hospital as laboratory technician, she happened to use her skills in information and communication technology: actually she came out to be the only person in the hospital who was able to use a PC.

> "I worked at the hospital where I was very appreciate due to my experiences with computer and new technologies, which they lacked at all. Then the head physician cared a lot of me because I helped him very much, I did PC programme for him, I also had the key of his office this was a big responsibility but also a satisfaction. I took some courses addressing doctors and I enjoyed it very much, you know what I mean, when you are appreciate, you feel good…"

Passion first

The first common factor we can recognize in these biographies is the presence of a very rich family background, full of knowledge, culture and values. All this results in education and career trajectories full of big passions and sometimes contrasting interests, leading to discover in progress what one really wants to do and to be. People in this pattern seems to be particularly open-minded, generous and socially committed.

This biographical pattern corresponds to a typical "erratic career", usually free-lance work (that it is the most free and creative way to work), with many turning points and, sometimes,

entries and exits in different field of activities. Working alone is often balanced by a rich social life. We could also name this kind of career "no boundaries", since there isn't a actual separation among working, family and social life and personal inclination.

BIOIF15 (Sha) is 40, lives in Milan and works as illustrator. She has been a "wall writer" and now she is a free-lance web designer. She divorced from her first husband; she has a child of 9 years and she lives with a new boyfriend.

She has a rather articulated background and uneven education path. A continuous "coming and going" from her science-oriented familiar cultural background and her personal inclination to arts characterises her trajectory.

> "I'm a only child in a family of scientists: my father was astrophysicist, my mother biochemist. By the way, the rest of my relatives are physicists, biologists, chemists and engineers. I'm the black sheep because I'm has always loved drawing, since I was a little girl. I grew up eating bread and physics, I studied at a scientific school, although I would have liked more artistic studies. At University I attended physics but I did not do any exams and so I got my revenge…"
>
> "I started following my inclination and I attended a two-year course in graphic art, this was in the period of graphic and design boom, the I attended an evening course in illustration when I was already working as illustrator. I became very interested in the communicative aspect of image and in psychology of communication, so I started psychology at university, I gave some exams, but I can't manage both working and studying, and I gave up the university."

After some attempts to keep together her diverse interests in a unique trajectory, she turned her learning anxiety into something more practical and decided to get a job in publishing

> "I worked as illustrator in publishing sector, both books and newspapers; I liked it very much and I met a lot of smart people in this period."

The publishing company was the occasion to meet ICT.

> "Meanwhile computer was spreading also as far as graphic art was concerned. I have to say that my father started using PC in the '80ies and he taught me the first things such as how to programme in Basic. At that time it was usual for me to use PC, it was a sort of reconciling with my family, I have always liked using PC: the ancestral dilemma between science and art."
>
> "I learnt by myself how to draw using PC, my father gave my is old machine when he bought a new one (at that time I started living alone). At that time did not exist training course in informatics and I experiment what the "learning by doing" really means. I started doing cover for records: the musical business opened to new technologies earlier than the publishing one."

Meanwhile she changed again her field of activity.

> "I got fond of decorating and after a evening course in this matter I opened a laboratory together with two friends. We made decorations on tapestry, mosaics and windows. But we did not have such an entrepreneurial attitude…
>
> "I got married and had a child. After a few years, both my parents died in short while. I bought a PC and I jump in the net. I need to do new thing, I came out from a terrible period of my life, there as a whole world to discover, which saved me."

She joined a "social centre" where many young people meet and where she collaborates as voluntary teacher in computer science.

> " I had also met a group of people, the hackers, fighting for digital rights, exploring this new frontier to understand chance and space of freedom in order to protect them. Most of the were

computer scientists: I closed the circle between art and science. I studied programming. We also started organising free courses while we did our job, we helped each other…

She enjoys the freedom of her working conditions very much.

"Moreover it is very comfortable that I can work at home, choosing my working time in order to spend more time with my child. Although it is almost a dream working, and caring at the same time: in fact you do only half a part of each thing. You need to be very well organised. In the morning, while Lorenzo is at school, it works, but for the rest of the day, you never can tell: all "creative job" such as advertisement, publishing etc. do not have times and boundaries, especially when you are a free lance. And the work on the net has the same feature of the creative work: it is a mess, you have narrow deadlines. Sometimes I work till 4 in the night or I have my laptop when I collect my child from school and while he plays in the park I work. Fortunately I like using computer, so I can stand the uneasiness in every thing you have pro and versus."

"Actually I can afford the uncertainty and the demand of a free-work, because I have my world apart, my being committed in a shared social project…"

BIOIF10 (Sandra) only at a first glance comes from a different world. She does digital visual communication and graphic design as a free-lance, she live in Catania.

She almost an artist as for her life style and way of working.

"I'm 45, my family come from Tripoli, I'm the only one who was born in Catania. I've a sister and one brother, they both are older than me, we go along very well. I've a good relationship with my mother too. We are a bit "non-standard" as Catanesi because we had an "open-minded" experience compared with the usual Sicily-style, which advantaged me. My father worked for Italian telecom company, my mother was an housewife, they bought me up in not a severe clime, on the biases of freedom and respect for other people. I feel very close to my family, but we are independent each other."

"I got married three month ago, we lived together for a short period before getting married, but we knew each other at least from twenty years. Then this thing happened quickly and it has such a nice and enthusiastic thing, because it was done when we being adults.. we have a relation of deep love but also of friendship, it is a beautiful situation. I do not have children, and I do not think I could, because of my age; I have 11 cats, although they are not substitutes for sons. And if I could have chosen, I surely would have adopted many children, I would have preferred helping people who can not provide to themselves, but this need a lot of money and I should have been married.. Now I could do so, but there is a problem of money and of time."

"My work is very occasional, although I had done a lot of different things in my life, I do not have a standard and steady job. I manage to provide to myself, but I do not have any continuity, except for some period of my life when I dedicated to exposition happening, working even 20 hours per day. So working hard do not fears me."

She often moved for work but she is very attached to her region Sicily.

"Because of my desire of communicating, I tried to understand what graphic art and visual design were, but here in Catania I did not have any chance of training, so I had to go to the North of Italy, to build a lot of professional relationship, to go to workshops and conferences. I had contacts with important people, such as Armando Testa e Bruno Munari. Once I came back to Catania, I was about 24, I built a company to deal with visual communication, advertisement, at that time computer technology were still at their beginning."

> "Due to things I do, this is not a good place, it is difficult situation, but concerning this, probably I have such a strong feeling for my mother and my sister, that I would never go out of Catania. For a short period I attended the Art Academy."

She is a successful person in her profession, which makes her very proud.

> "As time goes by, I started getting in touch with bigger and bigger companies, till I was chosen and without any "push" or help, just for my work. It was an important company, Orangefresh, it was in 1987 and 1988, and I deal with an important product: a machinery which provides you a instantaneous orange juice. I had just to deal with visual communication and graphic, but in fact I did a lot of things relating to advertisement. When I went to Milan I brought six orange trees from Sicily and can't tell how many oranges. They came out wonderful pictures and they were seen all over the world. To sponsor the brand I used a painted decoration which remind you of Mediterranean atmospheres and it works! You can recognise it on the Orangefresh tracks immediately. People phoned me saying 'did you do this work?' It was such a gratification!"

> "I had been in charge with thousand projects, the latest was an advertisement campaign for the municipality of Catania. I've dealt with national conferences too, I have done many different things… My name is well known and I do not want to enlarge the number of my client."

She works alone and she takes extreme care of the quality of her works, especially as far as the clients needs are concerned. She doesn't care of earnings, she is more interested in appreciation from others

> "When I have a task, I have to understand what exactly they expect me to do: my imperative is to satisfy the final client: communication have to address the final customer. I mix computer product with material product I've already realised, such as painted decorations, pictures…

BIOIF10 too, as BIOIF15 doesn't see any boundary between her personal life, her work and her civil and social commitment.

> "I love my work, I thing I do it very well, although I'd like to do more, I'd like to contribute to the real communication among people."

> "Being a woman did not disadvantage me, I only have to prove to be better than the others…I do not think I had suffer from discrimination, I thing there are unequal things in general, and what happened to me was consistent with the statistical, so you have to fight.."

> "I also join a "anti-racket network" (a group consisting of simple citizens fighting against mafia criminal "protection money")."

> "I don't have a lot of free time also because it is very much mixed with my working time. My working doesn't cause me stress, I like walking, going around and seeing beautiful part of our Sicily or of other places, while I'm doing so, I have new idea for my work. It is a union in everything."

There is another biography that could be included, for some aspects, in the "passion first" pattern. That is BIOIF05 (Daniela). She says:

> "Programming is also a passion, you can't do this work unless you love it, because it is continuously changing and if you don't like it you not even update your skills, you don't study. The desire of learning more and more is typical of this work, because you have to develop, to improve. "

3. Cross cutting themes

The home

Entering new professions – like ICT professions are – requires a surplus of capability to take risks, élan and enthusiasm. Evidence from our interviews shows that this ability is given to our women especially from father's model, but surprisingly (and especially in South), from mothers too.

Anyway, family as a whole appears to be very important – both in a concrete and a symbolic way – for most of our interviewees. In the majority of cases, families give a great emotional and moral encouragement (and also an economic one) which reflects into educations and careers choices:

> "My parents have always supported me: they have always been by my side as I was studying and they gave me always the possibility to follow my inclinations and do what I most desired" (BIOIF05)
>
> "In my family there's always been a good atmosphere: far away from the limitedness that's typical of Sicily. My schools years have been lived under the sign of freedom, personal growth, culture, and what I learned at that time helped me a lot later on…" (BIOIF10).
>
> "They let me decide my road alone, they never try to force me into anything…" (BIOIF02)
>
> "I was lucky: my father decided to give me as a gift the possibility to attend the Istituto Europeo di Design (which is a good but quite expensive school) for three years" (BIOIM13)
>
> "With my parents I have a quiet relationship, without conflicts… I'm used to talking more to my mother than to my father. They know everything on me and let me free to make my own choice" (BIOIF02).

Families often passed on to the children the importance of education and the significance of working for one's life:

> "I think my parents have always regretted not having a good education, and they've wished for us what they hadn't had: we could study anything we wanted, but we had to study." (BIOIF20)
>
> "My father passed us on values and a good education: but what was really important for him was that we understood the value of work. My father insisted that it should have been our highest priority, that a job comes even before your own family…"
>
> " At home they wanted me above all to learn a profession…" (BIOIF17).
>
> "My father has always been working a lot…" (BIOIF16)

Parents, brothers and sisters are often seen as models for a job's choice:

> "In our family almost all of us have some sort of inclination towards drawing and painting…" (BIOIM13)
>
> "I come from a weird family…they are entrepreneurs of themselves" (BIOIF19)
>
> "I attended a scientific school just as my brother (who went on to college and chose aerospace engineering) did."(BIOIF16)
>
> "My father is retired now. He was so satisfied with his job that he tried to pass it on to me…" (BIOIM06)

Especially fathers appear very important in influencing the career choice:

> "My father was very strict, he had his own studio and he wanted me to work with him. He taught me My father taught me to draw, to write, at that time we still used paint and pencil.. Thanks to him, I found easily a job. I wasn't sure yet if I wanted to work as a journalist or if I wanted to be a graphic designer, so I did both for some time: I worked mornings in an economic magazine and afternoon with my father…." (BIOIF14)."

Surprisingly, mothers look important as well. Mothers have a strong influence on young women particularly in Catania. They push girls to get independent through having a job. Mothers in business, emancipated and resolute, represent a strong incentive for girls. But also mothers who have never had a job encourage their children to study hard and to get employed as soon as possible:

> "My mother has a small shop and my father is retired now. What I do now is similar to what my mother does: it deals a lot with abilities such as selling and relate to other people." (BIOIF09.).
>
> "My mother worked for quite some times, than she decided she wanted to be a housewife again…And now she regrets leaving her job…I think a woman who is used to having a job finds too hard staying at home". (BIOIF02)
>
> "Both my parents have a diploma. They both are teachers. Also my brothers have a diploma and a job. I'm the only graduate in my family, although my mother would like they were graduate too" (BIOIF08)
>
> "The strongest impression we had came from our mother: she always said we absolutely had to find a job, because you never ca tell what can happen in one's life… And she was doing it for sure: in the 50's the women who worked weren't many, and in Alessandria, a small town, there were only two other leather goods shops before she opened hers..." (BIOIF19).

Although sometimes the traditional role of mothers prevails:

> "I'd rather prefer to do what my mother does: she is an housewife" (BIOIF01)

The environment: northern and southern cultures

The general environment appears quite important as well to shape individual educational path and career choice, for example the inclination to security versus more risky orientation or the personal balance between work and extra-work life. As for the Italian case, we could have a confirm of the deep influence of the environment in comparing biographies made in Milan and in Catania. The most interesting diversities we could find were the different employment opportunity. Scarcity of economic activities in Sicily makes it very difficult to find a job, especially for graduated people. Anyway, in very recent years (nineties) the creation of new business ICT activities in Catania was supported by government public policies (and this is the main reason we chose Catania to make our Southern interviews).

In some cases, especially in the South, the decision to turn to new ICT jobs is made in order to optimize the chance to find a job. This can happen to women too, although it appears especially a male orientation:

> " I decided to work in this field not following a personal desire…I mean, I've always preferred technical subjects, but my choice at the University was determined by the need of finding a degree which could let me into the labour market right away…Computer sciences seemed to be the most convenient degree… (BIOIM07)
>
> "I was fond of computer since I was a boy… I choose computer Science at University, because it was a new faculty… I liked the subjects. My parents encouraged me a lot, since in Catania there weren't so many chance to get a job…" (BIOMI04)
>
> "I started an evening course of Microsoft certification as well: I decided to learn computer science because I was afraid languages wound not be enough to find a job… Computer and languages: it seemed me a good combination…" (BIOIF12)

Other cultural influences are important as well, particularly referring to gender culture. Being the women's participation to labour market very low in Sicily and, vice-versa, still existing a

very strong traditional division of roles in the family between man and woman, our Sicilian female interviewees - even if most of whom are very young and don't have children yet - often appear worried about the way they will reconcile their job with family life.

> "My parents want me to have a family, to be secure, not to stay alone…This is one of the main matters for my mother." (BIOIF02)

> "My boy friend would rather I had a more quiet job, since we have a mind to marry and to have children... This job doesn't let you have children easily." (BIOIF03)

Also the managerial culture is sometimes very narrow in Southern business:

> "I remember a woman, a colleague of mine, who got married as soon as she entered the company. I've been witness to what our boss said after a while: 'Let's try not to have a child right away, ok?'" (BIOIM04)

On the contrary, ICT professions look quite attractive for Milanese women, who are more used to the competitive environment of the Milanese labour market. Actually, women here seem to be willing to take up this challenge. They also consider hard working as a "part of the overall game".

> "When I was in D., it was really a very nice period. We were a good team. We worked hard but well …" (BIOIF16)

Moreover, most of northern women – at least the elder one – have already a good deal of successful working experiences behind them.

> "Then D.H, the new director of 100 Cose, was proposed to make the new magazine D. She asked me to follow. We had already worked together for so many years, so I accepted... She let me the free hand for the graphic design part. It was really a exciting experience…" (BIOIF14).

Sometimes they are considered even too much competitive but they generally tend to declare they have never been discriminated.

Educational choice

Choosing technical/scientific disciplines and jobs depends on personal aptitudes. Sometimes, the desire to decide autonomously the line of studies may mean a rupture with familiar schemes and preferences:

> "I'm an only child, I come from a scientists' family …I grew up breathing physics and mathematics…I went to a scientific high school, but I could already feel that in me was strong an inclination towards arts…I started the university with the idea of getting a degree in Physics, but I didn't take any exams and I soon gave up…" (BIOIF15)

People come to ICT professions also following some other personal inclinations and education paths. Arts, for example, like in the case of some biographies of ours: BIOIF15, BIOIF10, BIOIF14.

> "I bought a PC and I jumped in the net. I needed to do new things…There is a whole world to discover in Internet…" (BIOIF!15)

> "As I have studied graphic design, the spread of new technologies help me a lot, it gave more opportunity to my work" (BIOIF14).

> "I'm an artist. I often mix computer product with material product I have already realised, such as painted decoration, pictures…" (BIOIF10)

While most our interviewees addressed spontaneously to scientific disciplines and to ICT jobs, some of them – especially the ones who aren't so young- turned to ITC jobs by chance or because forced by the technological change, just like this graphic designer working in a magazine:

> "In 1992 computers have been introduced in our editorial office too…A computer gives a better chance to do almost every graphic work…before that, we've always made the work by hands: we had to cut the images, make 1000 photocopies, adapt the images to the available space…with a computer all of this can be done in two seconds…copy, paste, cut…" (BIOIF14)

Career path: development, mobility, ruptures

Opportunity of career developments are very frequent because technology's skills are always changing and the demand for new services and the creation of new professions are constantly increasing. Nevertheless, this may be a problematic condition for women because the ICT labour market requires a large *mobility*: people can lead a successful career only if they change their job frequently.

> "If you move you gain, if you don't, you don't go on" (BIOIF19)

Men are advantaged, especially if moving from a company to another means changing the town you live in. BIOIM18 is a very successful man working as general manager in an IT consultancy. During his career path, he moved quite a lot. He began in a small software house with his university teacher and some colleagues. Then he went away exporting the product to another company… Eventually he build up a small consultancy firm for health sector. Twice he was followed by a colleague of him, a woman we interviewed too (BIOIF19). The last move was out from Milan and :

> "This time Manuela didn't want to follow me to Pavia…" (BIOIM18)

Women are than disadvantaged, because they need more, stability in particular when they have child-care responsibilities.

> "When my boss asked me to join a new exciting project in Rome, I really was tempted….I intended to bring my whole family with me, but my child told me 'If you do this, I will commit suicide..'. And my husband told me that his mother was sick and since he was the only child he can not effort leaving her. (BIOIF14)

Anyway, sometimes women aren't happy anymore about their initial choice. We collect a very highlighting narrative about a career rupture. We interviewed a woman who after many years decided to give up her career as It project manager and now is computer sciences' teacher:

> "The atmosphere at work had changed..... There wasn't any team feeling anymore, too much competition, and constant arguments between colleagues. I was really sick of it, by that time: I was working too much, and I needed to fight for every single thing I wanted. I decide to try and apply for a teacher's place…now I teach Computer sciences in a technical institute… My life has radically changed, I feel like I were constantly on vacation, the school where I teach is not far from here, and close to my children's one. They are now one in first and one in third grade…I can go and pick them up, I can spend my afternoon with them, I can do at home most of my work, such as grading papers and prepare for class…" (BIOIF20).
>
> "For me it has been a very tiring experience…at the end I really thought it didn't work anymore, and I decided to change…" (BIOIF19)

Working conditions

Women are generally satisfied in these jobs, although working conditions are often described as being difficult. Narratives say about prolonged working hours, rigid deadlines, frequent overtime and the necessity, maybe too often, to work at home, too.

> "What I really difficult find, is that I hardly have time for something else than my job …" (BIOIF15)

> "We always have a deadline, and we never make it, and because of that we need to work overtime. We work constantly under stress, and our life is a big rush…I'm always in a hurry, that's why as soon as I get out I prefer to do something calm…my job is frenetic and exciting enough. I'm every day there at 8 o'clock, and I begin with my work, and I'm always behind because every day I get something new to do, which added to the old ones..."(BIOIF05)

> "I can work night and day, when I need to have a project ready" (BIOIF15)

> "I can say that my professional life hasn't had any constraints due to my family life. Whenever I've been asked to stay even till 10 at night, I have never said no" (BIOIF20)

The situation is even worse for free-lance workers and small business (where sometimes women are among promoter partners).

… "We decided to create our own business. We did everything by ourselves: no loans, no debts, only working like mad, beginning from little, like ants …" (BIOIM13)

Anyway, these conditions are generally well accepted.

> "Although I had done a lot of different things in my life, I do not have a standard and steady job. I manage to provide to myself, but I do not have any continuity, except for some period of my life when I dedicated to exposition happening, working even 20 hours per day. So working hard do not fears me." (BIOIF10)

In southern Italy, where working conditions are worst, they complain especially about low wages:

> "I was so frustrated because of my job during the last years... I've been working for 5 years but my boss decided not to take in consideration the two years of experience that I already had, he made me start all over again…" (BIOIF03)

> "I'm satisfied with my job, but I can't be satisfied about my salary: I'm paid 650,00 euro each month, and I work 8 hours a day…." (BIOIF01)

Technology

Whichever way they've been introduced to the ICT field, all the women we've interviewed appear to be curious and enthusiastic towards new technologies. Generally they say to be very satisfied about their job, especially as for the professional content: skills, learning by doing, always new abilities to learn, creativity (in some fields). Sometimes this job is a kind of overwhelming passion:

> "I'm not interested in having a successful career, but I very much enjoy the technical work and the programming that I do" (BIOIF17)

Also when they turn to new technology without having a specific interest in it, once they discovered it, they can't avoid using them in different aspects of everyday life too.

> "I was a graphic artist… I liked computer immediately I learnt quickly all graphic applications and as soon as Internet appeared. I became passionate and I started building every kind of web sites, working in 3D, creating characters and making them act as if they were

> cartoons. I make videos, videogames or even still-life pictures not different from the one I used to do when I was an illustrator." (BIOIM13)
>
> "The introduction of the computer in our editorial office helped me a lot: it has given us more possibilities, it was lots more fun. Before that, I felt discouraged and bored with my job, I didn't like living in Milano anymore, I was constantly thinking how to get away... But it all changed so radically, the working process and all the rest, and I regained my enthusiasm..." (BIOIF14)

An important factor characterizing most experiences of our informants is the early interest for computer: some of them – both men and women – were given a computer as a present from parents when they were very young.

> "I programme since I was 10 because my father had bought me a computer, the old commodore. I programmed in basic the passion already existed" (BIOIF05)
>
> "I always spend my free time on computer. I remember when I was a little girl my mother bought for us the first computers, Spectrum, Commodore 64 and Amiga." (BIOIF02)
>
> "I had a bent for computer and when I was a little boy I already did short programming" (BIOIM04)

Contrary to common believes, for most of women technology – both soft and hard - can be very creative.

> "All "creative job" such as advertisement, publishing etc. do not have times and boundaries, especially when you are a free lance. And the work on the net has the same feature of the creative work: it is a mess... " (BIOIF15)
>
> "Now assembling a Pc is an art, at the beginning I did not know what to do with all these cards, cables.. then when you start understanding what there is inside a computer, you start loving it and what at the beginning seems you a terrible mess you can do easily and it very nice what you can find inside a PC.." (BIOIF09)

For someone, technology is the right way to close the circle between science and art

> "I closed the circle between art and science. I studied programming…"(BIOIF15)

In most of the cases, women we interviewed use PC in working time as well as in their free time.

> "When I go home, I spend usually at least two more hours working at my computer" (BIOIF14)
>
> "I'm not a computer fanatic, but I think it is an essential mean: I use it also for doing the shopping list and everything of my new activity is on PC (data base, pictures etc.). I think that the whole new technology helps us a lot in everyday life… We can do more things and better (I try to make it clear to my mother, but in vain). If I go out without my mobile phone, I feel I am naked… (BIOIF19)
>
> "I can't help using PC, I work on it every day and I consider it to be a familiar and useful tool, which I like to use" (BIOIF20)

Anyway, not always the use of technology is funny and passionate

> "I've never studied anything about computer, I not even have such a big sympathy for computer tools. And for a kind of "fortune joke" I arrived in a computer company". (BIOIF16)
>
> "I'm actually not a computer freak, I never use it at home, it's just my job…" (BIOIM07)

Gender issues: female characteristics, discrimination, maternity

Which particular characteristics are recognised to women in these jobs? Are they any specific *female characteristics*? Men and women interviewed agree about some positive qualities and aptitudes of women: they are more curious, more precise, they have more intuition. Yet, as someone underlines, they are – and they have to be - more aggressive to resist such a hard environment:

> "I believe women have a better capability to see further away, and to catch details…men aren't able to have such a 360 grades view… Most important, women have a good sixth sense, and for this job, it's important to have such qualities".(BIOIM18)

> "Women have – how can I say – a more innocent approach… They are more free from prejudice. So when they learn to use, they use it at the best" (BIOIF15).

> "I think that women who work in this field and want to have a career, need to be stronger and more aggressive, they have to work more…"(BIOIM18)

In particular, women are considered more suited for working with internet than men. "Web is woman", as this man says:

> "The saying 'WEB is female' it's true. And I must say I really prefer having women doing HTLM, not men. Women are more precise, they check if there's any mistake, they work more and with more passion. Men are good anytime that what is needed concerns programming, if there's engineering work to do. Women are more dedicated and achieve better results on what graphic and creativity concerns…".(BIOIM13)

> "Compared with men, women have a deeper capability of interpreting and using computer and of seeing its potential… Men use it as a machine, women just as a means to make something else .... In my opinion, women have a more open-minded relation with technology. The problem is they – except the ones working everyday on it - usually belong to the digital-divide population"(BIOIF15)

Women often tend to deny *discriminations* and difficulties, unless they are very evident (as in some Southern experiences). Also men interviewed say they are not so evident. Moreover, they say that many women in high positions are present in this sector. Nevertheless, everybody admits that careers for women are slower and harder, especially in relation to maternity and child care.

This is the point of view of our male informants:

> "I honestly believe that women are still discriminated at the work place: I think that even today it is not always accepted the fact that a woman could or would become mother.." (Nicola S.)

> "Having a successful career is no doubt more difficult for a woman, also independently on maternity. Anyway, things are getting better: a company like IBM – that was well known as a company discriminating women in hiring - now the chief of the health sector is a woman" ((BIOIM18):

> "In my opinion, being a woman or a man is not relevant to have a successful career. Actually, women are still few in high position because they do not enter ICT sector…" (BIOIM06)

And these are some points of view of women:

> "As far as I am concerned, I have not been put aside… Maybe, only once… when some advancements were stated and, eventually I wasn't promoted… Anyway, what I see is that they think a lot before assigning a responsible position to a woman… "(BIOIF8)

> "Programmers are all men, in my company. The nicest thing they tell me when I work well, is 'Si masculo!' (you are a man!)". She laughs. "I didn't find any discrimination, I have the same position many men have and I am the supervisor of male colleagues." (BIOIF05)

As for *maternity*, women who had experience of maternity-leave say they didn't have difficulties to come back to their job: they had understanding boss and sometimes they could stay up to six month or more away without any consequence for their job. For some of them, instead of representing an obstacle, maternity was a positive occasion to "begin again" and collect new enthusiasm in working or, as in the following case, in learning to use computer.

> "As I came back to work after having my son, that I learned how to use the computer: I learnt very fast, I enjoyed doing it, and I really wanted to go begin again to work and to learn something new, so I think that in a month or so, I had made up for all the time I had been gone…" (BIOIF14).

However, the only mother we interviewed in South had an harder experience during maternity:

> "Among bosses The classic male chauvinistic set of ideas is still strong…when I got pregnant they all made jokes like "that's the last time we take a woman to work here"…During my maternity absence I had left my job to a person who did it wrong, and my boss told me it was my fault...At that moment I really thought he was being unfair…Once I went to my gynaecologist for an examination, and as I came back he asked me to make up the hours I had lost…I didn't do it." (BIOIF01)

Reconciling work and family life

In general, female interviewees tend to deny any difficulties in managing together work and family responsibilities. They have often understanding partners (most of them working in similar activity), grandfathers and a numbers of babysitters. The Catanese mother doesn't have any problems, since her husband is unemployed and this way he can care of their child.

> "It's my husband who takes care of our son, with my mother and my mother in law. He does more around the household, too. He is at home most of the time, and coming home at 8 o'clock every night and having only the weekend to relax, he's the one who prepares the meals for our son, and who goes out with him.. " (BIOIF01)

Some of them think that working in ICT is a good situation to reconcile work and family life, because you also can work at home:

> "Working as a programmer it's not too bad, when you have small children, because you can do it at home too". (BIOIF17)

> "I go out with my computer to pick my son up. After school, we go to the park: while he plays I can work…" (BIOIF15)

> "I work all the time, but Saturday and Sunday are entirely for my daughter…" (BIOIM13)

Although most of them are younger and do not have children yet, southern girls are more worried than northern are about the difficulty to have a good balance between work and family responsibility when working in ICT professions. They are likely to undergo both the anxiety about the lack of job opportunities and the pressure of traditional female and maternal roles: so for them the risk to renounce is higher.

One of them says she would prefer to be a housewife like her mother. Another one regrets not choosing a teacher's job:

> "...and now I really happen to ask myself: why didn't you choose to be a teacher? I could be free every afternoon, stay with the children…" (BIOIF03)

> "Sure I think about having a child…but not now. It would be to difficult, I don't know if we could make it with our job...I've always thought that the most important thing is having a family…that's why I got married young." (BIOIF05)

> "I'm only hoping that Nokia will introduce the possibility of part-time as well…I thought about finding another job, because I know that this way it's impossible to stay with your children…A colleague has a little daughter, and she stays with a baby sitter the whole time…I know I need to have time for my family, that's the most important thing…"(BIOIF03)

Anyway, it is a matter of fact that most women with family responsibility we interviewed – in Milano as in Catania - chose to work part time when they had little children.

Personal life

Differently from men, women in ICT business keep a intense personal life. All of them have hobbies and other interests besides work. Gym, dance, dog-breeding, music.

In some cases, these hobbies become almost a second job. This happened to BIOIF19, who recently asked for part time work, despite her position as a project leader with much responsibility, in order to be able to follow her passion for bijouterie creation:

> "I made request for a part-time job: I wanted to have more time to dedicate to my family and I had began an activity that I really enjoy: I draw and make jeweller's craft, putting together materials of things that I find on my trips around the world…stones, glass, and other less common materials." (BIOIF19)

And also for BIOIF17, who followed a very similar path. Strangely, for both, the hobby/second job is a very traditional female one: bijouterie craft and lace and crochet!

> " I would like to devote myself to what I really love: cooking and embroidering. If I could I opened a shop of laces. I'm very clever at making lace on a lace-pillow and crocheting: I love so much this kind of things! I have my web-site: they send me messages from everywhere, it is funny, I don't earn anything ... but it's a dream" (BIOIF17)

Report of the Biographical interviews – Portugal

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1. Summary of the 20 interviews

CODE	PROFESSION	AGE	FAMILY STATUS	Nº OF CHILDREN
1M	Programmer	23	Single	0
2F	Software Engineer	24	Single	0
3F	ICT Project Manager	38	Divorced	2
4F	Helpdesk	49	Married	2
5F	Webdesigner	36	Married	2
6 M	Customer Support Engineer	37	Married	1
7F	IT Consultant	32	Single	0
8F	SAP Consultant	27	Single	0
9F	Applications Developer	46	Single	1
10F	Helpdesk	34	Single	0
11F	Account Manager	40	Married	1
12 F	Bussiness Project Manager	46	Married	2
13 F	Integrated Technology Services Director	43	Married	2
14 M	Database Administrator	33	Divorced	0
15 F	Visual Graphics Designer	27	Single	0
16 F	ICT translator	31	married	1
17 M	Technical Director	32	married	1
18 F	Informatics Engineer	29	Single	0
19 F	Costumer support	27	single	0
20 F	(outsourcing) ICT Consultant	43	married	2

Summary:

- Sex –16 women and 4 men

- Age – 4 persons in their twenties; 6 persons in their thirties; 5 persons in their forties.

- Children – 8 persons with children; 7 persons with no children

- Status – 7 single persons; 6 married persons; 2 divorced persons.

2. The home context

Parents

In the family context, the more relevant role model emerging from the interviews seems to be the father.

For 7 of the interviewed persons the influence of the father was decisive for choosing a scientific area that prepared them to later work in the ICT area.

Three women now in their forties – that is, women from an age group that entered university more than 25 years ago - clearly acknowledge the influence that their father's professions had when they were in the process of choosing a degree:

> When I was trying to choose my profession, engineering, my father was an engineer, I had always liked computers, new technologies (F12)
>
> "I chose, well, I don't know… perhaps because of my father, I chose Sciences, and then, I chose Mathematics" (F13).
>
> I first chose Electronic Engineering, because I was very good in physics and in electronic circuits, I liked that, I was the only one in my class who understood… and everybody came to me to copy, and I used to say "this is going to be my future". I've always liked mathematics, no chemistry, no, I hated it, but physics and mathematics, these were my favourite…, and my father, he is also… he also likes those disciplines, that is hereditary, and I thought I had to do Electronic Engineering, but when I began the course… it frightened me that… that the average number of years to finish the degree was nine (…) and so I decided to change and also, in informatics there were more jobs, then in engineering , for women, I mean. (F20)

A younger woman (F7) - in her thirties – also mentions the fact that the father was "somehow connected to computers" (in the financial sector) and that this fact had influence upon her choice. In this same age group, another women mentions the role of the father not as an active influence, but as relevant in letting her make her own choices –

> "My father, he let me had the decision, and it was really good of him, really " (F3).

In the younger age group, one woman was also very emphatic about the importance her father had in her professional orientation – not because he works in the area, but because he regularly bought her new computers:

> "When there were new PCs I could buy them, I said, I like computers, and my father, my father bought me the computers; (…) my father had a bit of an influence" (F2).

A man in his thirties also refers to the influence his father had in his preference for "mechanical toys":

> When we were still very young…there was the spectrum, and all that fantastic stuff, and I had the opportunity of having everything, when things appeared… My father was also like that, I

> mean, he also liked those toys, and so, I began liking them too, and used to disassemble them, I ruined some (17F).

However, the role of parents can also be important in pushing women away from the ICT professions. One woman (F5) emphasises the role that her father had in her first professional option (as a kindergarten teacher):

> "My father, he thought I should have a feminine profession, and they thought I had a way with children (…) and so, they somehow constrained my options".

Only one woman mentions the role of the mother. Again, this is a woman in her forties:

> "my mother had a degree in Mathematics, and it was something for which I had a natural capacity. Mathematics was for me something I naturally liked, and so, well… my mother was a mathematics teacher (11-F).

It is very interesting noticing how an area traditionally described in social stereotypes as masculine – mathematics – can also be described by this woman as "natural" for her, because her mother had a profession connected to it. The organising vector here seems to be the role of the mother in "naturalising" a skill and an option, by being a role-model.

Husband

The husband was another influence that emerged in one interview as very important. In fact, for this woman's (F5) career the husband was determinant – she followed him to the United States, where he went in order to complete a PhD in Computer Science. There, and after their two children were born, she initiated a specialization in web-design, just when the profession was emerging. The husband stimulated this option, and drew her to the world of computers. This totally changed her career orientation, since she had formerly been a kindergarten teacher, and is now, after returning to Portugal, a free-lancer web-designer that describes herself as successful in her field. According to her, it is still the husband – that after completing his PhD came to work at the university and has a IT firm - that keeps her up to date on all new technologies and software, by both bringing things home and by pushing her to acquire more knowledge.

Wife

One of our male informants described his childhood and adolescence as a period when his preference for "mechanical toys" developed, and this preference covered both computers and any other mechanical devices, such as musical apparatus. He described how, while still in high school, he had been a DJ for four years, and how that began to affect his school performance. He was already by then dating the person that is now his wife, and "*she pushed me to complete a degree, because I was a little lost… to the musical side. (…) and then I really entered university, and did Computer Engineering, precisely what I liked (…) and after I left the music, and dedicated my time to studying and to my girlfriend* (17M).

Brothers

One of the woman also remarks that the fact that her brother brought a computer home was important: "*we were still young, and that is how my interest was born* (10F).

3. The School Context

Friends and colleagues

Friends as role models are also relevant, in two main ways.

Friends can introduce one to the computer world, thus functioning as a first stimulus for families where there are no home PCs:

> I always was very close to a friend who had a PC, I think that he influenced me by showing me that world, my contact (with PCs) was at his home, and when I saw him tinkering with the PC… besides he always had the best things, the more advanced ones. We were always at each other's homes, and I did not even realize, but that was my contact with computers. (…) and then, in the 10th grade we both chose Informatics (1-M).

And friends are also influent when it is the moment of choosing a specific university and a degree –

> I think I was very influenced by my colleagues, those that chose the area (F3).

There seem to be "group decisions" for staying together in the same course. Besides, towards the last years of university, group decisions about applying for particular jobs and organisations also seem to happen (F8, F19).

Teachers

Only one interviewee (F15) mentions the role of good (high school) teachers as an influence for choosing the ICT area.

The majority of references to the school context emphasise both issues of capacity/preference (for certain disciplines) and features of the educational record. F3, F7, F11, F12, F20 all mention that they:

- liked mathematics, or statistics:

> (I loved maths, the reasoning, I've always been a good student - F7;
>
> I like everything that has to do with logic, this is what I like, I like maths because it is logic and I like system analysis because it is logic – F20);

- had a specific capacity for that area,

> (F11 - this was the area where I felt most comfortable, that I best understood, so I graduated in that area)

- had very good, or good, grades for those disciplines.

However, one woman (F9) in her middle forties talks lengthily about how, when she was studying (mechanical) engineering, she had difficulties - not that she was not accepted, or had lower grades - no. She mentions having trouble dealing with the permanent surprise of teachers and colleagues, or the lack of ladies washrooms at the university. But as the main issue she says:

> "The teachers? No, they did not give me a hard time, they simply did not accept me as a future peer.(..) They gave me good grades, but they made me feel that I was one woman in a group of men, and that this did not make any sense at all".

In the same vein, another informant also in her forties, remarks that:

> After (the course) it was difficult for a woman to find a job in the area of Electronic Engineering. I decided I did not want such a big challenge, and then, I changed to System Analysis, that was more… in System Analysis there were some women, and in engineering there were no women at all. (F20)

Appraisal of future career opportunities

9 of the 20 interviews mention that they chose this area because they saw future career opportunities as abundant:

- this applies to the area of technology and computer science (1M, 11F, 5F, 3F):

> "choosing computer science was like, placing my bets on something with a future (1-M).
>
> "At the time (when she selected a university) I knew informatics was a good bet in terms of future, of future jobs, and decided to give it a try…besides I had good grades in maths…so I decided… but knowing what informatics was, well, I did not really know. And then, I began to like it…It was not like I had this vocation.

- nd it also applies to the areas of mathematics, physics and engineering, domains also seen as good in terms of career opportunities (13F; 9F).

Transitions and inflextion points

Motives for transitions and inflexions include:

1 - disappointments with previous options, such as:

- *did not like* (mathematics, or the military career)

- discovered that there was no room for women (in engineering - 9F; 20F) or for self (in the air force - M14)

2 - Opportunities offered within the academic system, sometimes unexpectedly (19F; 20F)

> Why did I choose this degree? Well, it was simply because when I entered university there was Management and there was Informatics for Management, and so I thought, why not Informatics for Management? I was in a private university, and we have that advantage, in a private university, we can choose what we want, and when I was filling the forms, it was right when I was filling them, I was considering Management, but then I chose Informatics for Management, why not? And that is when informatics entered my life. (F19)

3 - Opportunities offered within the work-market, by chance, unexpectedly (8F, 6M, 9F, 15F). This is for instance how a women in her forties, describes how her career in the area of ICT began, twenty years ago.

> When I finished my degree, there was no way I was going to find a job in my area, because I am a mechanical engineer, specialized in production… and there were no women at all, and so there would be no jobs for… And so I initiated a course, an informatics course, at the Informatics Institute, I studied system analysis, and then I was invited to work here, when this Institute was founded. I came here to establish the Calculation Center, everything that had to do with informatics was designed by me, the programs… I designed them, and some I did…and afterwards, I don't know, six years after, I was invited to run the Department responsible for training in ICT. (F9)

4 - Opportunities offered by a life change – In this respect the biography of informant 5F is interesting. She was a kindergarten teacher, and accompanied her husband to the United States, where he went to complete a PhD in Informatics. Their second child was born there, and after a period she felt she had more time, and began a course in web design. That changed

her career orientation, since she has been working in the area of web design ever since, and never went back to being a kindergarten teacher.

4. The Work context

4.1. The Organisation of Work in ICT professions

The more frequent and salient issues of the organisation of work, as they emerge from the interviews, seem to be: team-work structured around projects, outsourcing, constant training and updating, flexibility and autonomy. In some cases evaluation issues also emerged.

Team work

This is perhaps the most frequent theme – 12 interviewees mention and describe team work, characterising their professions as dependent upon the capacity for working with teams, and 7 of these have very abundant mentions and descriptions of team work. 4 interviewees describe their work as involving commitments to both tasks and teams. These teams are temporary teams in connection with specific projects. Teams converge to projects. Since projects are changing all the time, individuals are expected to be ready to work with different persons in different projects. The availability and interest in working within a team is a dimension assessed in the selection interviews.

Team-work can happen within each enterprise and it can happen at the client.

1- Team work within each organisation

Mentions to the fact that the work each person is doing depends upon collaboration with others are constant:

> We always work with teams; even when I am working alone, in my laptop, at home, or here, or anywhere, this can be team work, because my work was previously organised, tasks were divided" (…) There is no need to be physically in contact in order to develop team work, and to feel that one is part of a team (M1)

Is team work described as mutual help? Is team work described as cooperation (every individual adds different pieces)? Is team work described as joint decision making?

It depends on the hierarchic level.

Team work seen top-down

For management and consultancy professions, team work is seen from a top down perspective.

From this position, need for full involvement and confidentiality are themes that arise:

> We have to be involved from the beginning of the project, to know what's in each data base, what's going to be in our hands, and what are our responsibilities, and the responsibility of the technicians, and we have to assure that there are no information leaks" (M14, pg 3).

From the same positions, power issues also emerge:

> In my case, I am very outgoing, and I have no problem becoming part of a team. Here (at the bank where she is in outsourcing) I worked with a team, and I've always worked with a team, because that is the way things are at XXX (big consulting firm where she was before), and before XXX I had been in other firms, as a consultant, I've always been a consultant, I always had to work with teams. It is not difficult for me… it is… well, now, that I am more experienced, now… it is more difficult to work with teams, because I am now used to giving

> orders… now I like to work with a team when the team does what I want, (laughs), but I think that is normal, comes with age and experience… (F20).

And sometimes the power dimension is wrapped with the terms "help and orientation" – the person who is speaking and is in charge of the team describes the situation as one where help comes from the others, and orientation comes from the self:

> Teamwork… well, it is team work in the sense that I need people to describe the situations for me, because they have the technical information, and they have to help… , and I, well, I, it depends on what they suggest, I may agree, or not. (…) I give them guidelines, I hear them, I hear their arguments, and finally, it is not that it is my decision, it has to be something we all agree with, but I, I try to push things towards the direction I would like…(F11).

Team work seen bottom-up

From the lower hierarchical positions, there are complaints about not knowing the logic of the programs, the architecture of the programs, the decision making that the programs incorporate, the consequences that the specific format of the databases may have for further users and/or clients (F4, M1, F10).

Other times team work is described as lack of space and opportunity for individual decision making:

> There's an a priori defined architecture, there are spaces and rights that cannot be changed, that is how the architecture was defined, and we have to work with it (M1).

2 - Team work at the client, and outsourcing

For 11 of the 20 interviews their jobs imply having clients outside the organisation, and responding to the clients demands and necessities. For the consultancy and management professionals (such as 7F, 12F, 1M, 3F, 20F), usually that also implies team work - first, different persons at the client describe their needs and critical areas, in long meetings, and the solutions are discussed together for all the areas of the client's firm.

Frequently team work at the client is combined with outsourcing. Some situations of outsourcing and statements about how frequent outsourcing is in this area were also found. Outsourcing was explicitly connected by one informant to the instability of the market and the possibility of hiring people only when there are projects (F3).

There is one case told by one of our informants that illustrates the dynamics and the problems that may arise in the interface between the client and the mother firm.

> Then I was placed at another project, the XXX bank, and that was very bad, my firm sold a package, a platform, sold as a package, but there were… well, 90% of the applications had problems, some were not even complete, and I had to lie to the client… and that was very difficult … (…) in that team we were fifteen persons, and that was terrible, full time dedication, any time of the day or night, and my children were very small. And having to lie to the client (…) and it was a big lie, because the whole platform was a disaster, part of it was not even complete. (…) It was very bad, very depressing, I lied, and then I arrived home at eleven o'clock, crying, because I had to assume integral responsibility. I had (someone above her), and this project was very poorly negotiated by this person, and they had sold not only the whole package but also the maintenance through outsourcing, and the outsourcing was for five years. And I was there and the applications were not running, and those that had programmed them had already left. I found a group of inexperienced people, they worked very hard, but they were very green, and it was a whole package that did not… (…) I was the face of the

> project, my (the person above her) showed up every two weeks, and kept his mouth shut, and it was impossible, I had to leave. (…) (F20)

Then, when she left the person that came to replace her negotiated for assuming only about half her assignments.

Flexibility, no rigid schedules

This is an issue very frequently mentioned, and an area where paradoxes are very clear. Flexibility is described as being both positive and negative, an asset and a disadvantage. It is positive because one can manage one's time and life more adequately, but at the same time it is a way of working more, of working all the time, and everywhere.

> Usually it is expected of informaticians to stay longer… we, if we leave at 5 o'clock, people look at us with surprise (F3).

Besides, flexibility and lack of rigid schedules are also frequently to be found in very mitigated forms. For instance, people arrive one hour later and leave one hour after. Or they may alter a little bit they schedule, but not much:

> I have a flexible schedule. So, one day I may arrive at 10 o'clock, and the next I may arrive at 11 o'clock, or perhaps I can come only in the afternoon. But when we do not come in the morning, we have to tell, we have to tell someone, and if one day I work 4 hours, the next I may work 9, or 10, but I have to tell if … (F2)

Polyvalence and multitask

> Two informants emphasise polyvalence and two emphasise the capacity for performing many different tasks, either at the same time or in sequence (multitask):
>
> "Besides managing the data bases, I usually describe myself as multi-task, I do many tasks at the same time. Three, four, like this, I have to machines, I use one for this, another for that, and, well, in another one, the more potent one, I open a number of windows, and I can work in several machines at the same time (M14).

Space organization and personal space

There are numerous mentions to:

- non personalised working spaces - nothing can remain on top of desks at the end of the day; clean-desk policies, implying fines to those that leave any type of papers, documents or even photographs at the desks.
- open-spaces;
- non permanent working spaces, with rotating desks, according to the presence in the enterprise or at the client;
- The constant use of laptops, and the perception of laptops as THE working space.

Professional training

For 13 interviewees professional training is a reality. Some professions imply an initial training to begin working (2F, 1M, F7). And the majority of them imply constant training, either within the organisation, with official packages, or outside the organisation, mostly abroad.

It is only in the lower hierarchic levels that we find a complaint about lack of specific training (F4) or complaints about a training that is now obsolete (F10; F15, F4):

> For that software for optical reading we now have, I had that training, one week, they gave me very schematic information, and if it was not for my personal interest, I would not explore all the possibilities of the software (4F).

Assessment

Five of the interviewees mention Assessment as a component of their work. For four of them, assessment is associated to promotion and recognition of their work.

Sometimes training and assessment are associated (F7, 2F, 1M):

> We are assessed every year, and our self-assessment includes suggestions that we do for training and courses we would like to follow. And then human resources and our chiefs, they can also suggest other courses or they can accept what we suggest (7-F).

4.2. Culture and Climate

Stress and pressure

These are professions experienced as stressful, and for various reasons:

- time objectives (deadlines) - 5 people mentioned these:

> "and when we have deadlines, and the time is running off ..,well it is stressing (2F)

- a combination of both strict deadlines and rigid objectives (7F):

> "This is a profession with a lot of stress, specially consultancy, because we have very short periods for the projects, and the objectives are rigidly defined, and so it is stressing. If one does not have a team...!" (14-M).

- the long working hours:

> "and for many years, I had another director, and the pressure was constant....ah...for instance, any time was good, we had meetings at 8 pm, and if we had to work during weekends… well… there was a lot of pressure, really (3-F).

- another source of stress, mainly for programmers and consultants, are the errors – programming errors or system analysis errors:

> "and with all the years I have as a professional, I still get very stressed by an error. Because there should not be errors, if there are errors it is because something was not correctly done, or there was lack of motivation, or some other problem. (…) And when the error is mine, or from someone in my team, my reaction is not good… (F20)

- conflicts arising from having to work under pressure, a situation described as leading to:

> "your emotional part taking control over your logical part; (…) it is not only solving the problems, because the problems, we know they are there to be solved, it is this situations, stress, situations that could be avoided and arise through pressure (M14)

Competition

- Competition can be denied –

I never felt I was competing with someone, or that someone was competing with me (2F).

- Competition can be denied at own enterprise and recognised at the client –

What I see is, when we are involved in a project, at the client, that's where I see it (competition) (8F).

- Competition can be denied at own team, and recognised within other teams (F3).

- Competition can be with the self –

No, I do not say that there is no competition, but people compete with themselves, in the sense that they want to progress, they want to do better (13F).

- And competition is recognised:

And since we are not competing with people in a different area… competition is between us, and that sometimes can originate conflicts (3F).

Interpersonal relations and the role of the organization

Several mentions to enterprise initiatives organised to facilitate interpersonal relationships in the enterprise - football teams, bowling, karting, happy hours every first Friday.

Creativity, Innovation, up-dating

These are key-words.

Innovation is something that is inscribed in the technology (12-F – *innovation is in the new technical solutions*).

Creativity is what you do with the innovation inscribed in the technology, and with all the other tools, and personal capacities.

Two interviews from the e-producer sector are very clear about it being important for them to be able to have space for personal creativity (1M ; 7F).

The continuous movement of searching for new technological innovations, new software, new solutions, new ideas, new conceptions of problems is also very present in a majority of interviews - up dating is a constant theme for everybody.

Some women mention searching the internet for that and/or using their relationships (friends and husband).

Autonomy

Responsibility and autonomy are themes that very frequently emerge. Seen top-down, autonomy is present in different degrees in all degrees of the hierarchical scale:

Autonomy is very important for one to assume responsibility and since… well, of course we have tecnicians that are senior, and we also have junior professionals, and it is not the same level of responsibility and autonomy, we cannot demand the same levels, but it is always possible to ask people to be responsible for their tasks, it is the tasks themselves that are not the same, isn't it? (13F).

When the issues are seen bottom-up, however, instead of autonomy we hear about lack of control (F4).

5. Gender and ICT

5.1. A numerically masculine world undergoing change

From a strictly numeric point of view, there is ample agreement that the world of ICTs is a masculine world. It is what a great majority of informants explicitly state.

It is interesting to note, though, that some of this statements are factual (*there are 30 men and 2 women in my organisation* - M1), whereas other statements are general - *it seems to be a masculine world, from what I see, my experience, it seems a masculine world to me* (F5) - and regard perceptions.

General statements of this kind – concerning perceptions and beliefs - can accommodate and respond to social and personal motivations, since they are interpretative statements based on personal sampling…

For instance, these assertions can accommodate self-differentiation goals - if there are very few women in the area, the self (a women in the area) can be presented in a favourable light - as successful in an area where not many peers succeed.

In this case, the numerical difference can be thematized as an advantage, or as something positive:

> "this is not something negative for me, that it is a masculine world, well… it can be an asset, I mean, I use both my skills and my charm, because I can take advantage of this being a masculine world… it is a package, my looks and what I sell, and I have had some success…" (5F).

6 informants mention that this world is masculine because there are few women choosing to do studies in the area.

As reasons they point - stereotypes involving gendered education, and parents influence pushing in different directions for boys and girls (5F; 1M); it being more "natural" for women to chose social sciences and arts (5F);

But the idea that women are now present in the ICT university degrees, but afterwards do not answer job offers in the area also appears:

> Yes, in the technical area we have two women here, in ten men, only two, well yes, it's a minority, but in reality… I am responsible for the recruitment, and well, in reality, when there is a job offer, the percentage of women that answers is proportional to the percentage of women we have here. I remember that when I was at the university there were, I don't know, about thirty, forty percent of women in my class, but no more than ten percent answer job offers, in terms of recruitment interviews we seldom have women answering the offers, so it is not my fault if… (17M)

Many of our informants, however, concur that men/women proportions in the ICT professions are currently changing.

And they see change when they contrast several situations:

- present and past situations (F9, F12),
- personal working place and other working places (F9, F12),

- own department/team and other departments/teams (11F),
- own specialisation and other specialisations (F12).

The differences described are consistently in the direction of present times and own enterprise/department/specialisation being less masculine.

5.2. ICT Professions - a world experienced as masculine over and above numbers?

Another way of looking at the question of ICTs as a masculine world is by trying to understand if - regardless of the actual proportion of men/women - this is a world that is lived/experienced as Masculine.

In this regard a number of questions can be asked, that the interviews help answering.

5.2.1. Is the ICT professional world experienced as masculine because there is a masculine climate/culture?

When discussing issues of climate/culture of ICTs professions in connection with gender, conversational differences are mentioned (6 interviews).

- From the point of view of women talking about female conversation, there are statements simply highlighting that there is difference:

  Women always have different conversations (13F).

  There is more intimacy in women's conversations (13F, p. 13; 2F, p. 16).

  Women misunderstand many things…and one can never… there are always several versions (4F).

- From the point of view of women talking about masculine conversation, the idea that women have to set limits is present (12F; F7; F5);

  They have conversations that do not respect… and I tell them (12F).

  They have some jokes, or comments, they sometimes loose control, but it does not happen often, not often…(7F).

- And also very present is the idea that this is not frequent, and happens mostly to other women, in different organisations/jobs, and has rarely or never happened to self.

  "I don't know, I don't have problems, maybe I am more open minded than other women, I don't know (7 F, p. 32).

  Even conversation, conversations are masculine, (…) but I personally never had problems..." (12F, p.18)

- From the point of view of men talking about women:

  Women like to talk. They like to communicate. I enjoy discussing tasks and projects with XXX. She is shrewd, gives a feminine touch to things, it seems as if she has more sensibility (M1).

- From the point of view of men talking about themselves:

  Yes, maybe we are more careful with the conversations when the women are present (M1)

5.2.2. Is the ICT professional world experienced as masculine because there is discrimination at the level of work assignments and tasks?

Very frequently our informants mention that at the level of assignments and tasks there are no differences between men and women - at work, people are Professionals, resources, not men and women.

> "…for me, the women are professionals before they are women (…) they take part in everything, conversations, they do the same tasks, have the same benefits, same salaries " (1M, p.19)
>
> "...no one separates… there is no men and women....it is all the same. It is the same, because we are all working for the same …" (2F, p.19).
>
> "…Knowledge, competence (…) that is what we call them, resources (…) a pen is a resource, and there are human resources. (…) exactly, we don't see if it is a men or a woman..- there is no sex" (7F, p.63).

At the level of taks, **Discrimination** is thus frequently described as non existent:

> "I never felt here, neither here nor in the other organisations I never felt any problems because I am a women, ok? (11F, p.12).

It is said that what counts is Merit and competence, and those should be the criteria (13F).

> "I think women have a very important role to bring about change. It is not men who have to change things, women have to do it. (...) And it cannot be something artificial, it has to came naturally…" (13F, p. 18).

5.2.3. Is the ICT professional world experienced as masculine because there is discrimination at the career level?

When it comes to careers and promotions, though, the situation seems to be different.

> …He is in a better position to be promoted than myself, and just because he is a men. In that department, some men, they, well, men promoted men (4F)
>
> For instance, my colleague (..) she worked with a man, and the director he had more confidence in the man, and they were the same age. It took the director 4 or 5 years to trust her..."(15F, p. 21)

And at the top professions, men are more frequent:

> "...this area, at the top, it is dominated by men, specially in the private sector (9F).
>
> "…the truth is, as directors, I always meet men, not women, up until now, at least… (8F).

Availability

Quite unanimous are the statements about availability being the key issue for the difference experiences of man and women. Several interviews dwell on this.

Women are described as less available because of children and house chores.

> "I feel this: they are available to stay longer then me. Because, it's like this, I have a housekeeper in the afternoon. She leaves at seven. And so at seven, I have to be here. And men, they have the wives, the wives are there. I do not know why, but the roles are always divided like this. The responsibility of arriving home on time to take care of the children is always for women. And so, in that aspect, I am disadvantaged" (3F, p.18).

This also prevents or complicates travelling:

> "…it is not very easy for married women to be able to away during the week, isnt it? (8F).

> Even when it is recognised that the organisation tries to accommodate the private life of women, understanding that they have to leave earlier, or cannot travel, the situation is experienced as threatening (8F; 3F):
>
> "…they possibly accept, they accept, but I don't know if it is really well accepted, it depends, if it is once in a while, of course…but on a regular basis, they don't, I think it is not going to be well accepted.

This issue of availability is interconnected with the issue of flexible working hours, and places. It is an advantage, but also a new problem:

> It is an advantage, because I can really have both a professional and a personal life, from that point of view, they become compatible. But also sometimes it means more work, because more mobility means more possibilities for… It is not so much the enterprise, it is we, we think we can do more, if there is the possibility of doing it at home (13F, p. 17).

Married and single women - have two different positions and seem to have different perspectives. For single women they are different from married woman:

> ... I just finished a project, it's finishing now, but since May that I go to (a town in the north) every Monday, and I stayed there the whole week, of course I could not do this if I was married, and had children, I would not be available for this. (8F)

Only one woman (still living with her parents) describes availability as equal for men and women (15F).

Married women emphasise that one can adjust, with proper help, although some options have to be made, for instance rejecting opportunities for an international career, or giving up fitting for a promotion (key-word would perhaps be sacrifice - self-sacrifice).

One of the interviews summarises this issue like this:

> "The organisation offers man and women the same, only women have other things outside work, that men don't have. It is easier, still today, in 2003, for a men to progress in a career than it is for a woman, unless the woman gives up being a woman and a mother, which is something that not everybody is willing to do. And so I would say that we have to change society, and to change things at home, as well" (13F).

Not Me/Not Now/Not Here

When talking about gender issues and work, perhaps the most salient feature of the interviewees' discourses are the Not Me/Not Now/Not Here mentions:

- Not now - *...I think there was discrimination. Today there is not. People don't…there is not… they have to know that they cannot look at things differently for men or women. Perhaps in the past there was ...But not since I am working here* (8F, p. 31). *In the past, I heard that the administration, there was a time when they did not want more women* (3F, p. 19).

- Not Here - *"Yes, I remember feeling discriminated, but by a client* (…)"

- Not from people my age (7F, p.33);

- Not Me - *I myself never had any problems with that, and I can deal with it very well* (F12)

Family responsabilities

Responsibility for children and house chores are mostly incumbent upon women. 9 of the interviewed women (the married and divorced) clearly state that.

Three of the interviews mention the difficulties of coordinating the personal and the professional spheres:

> "…To be a woman brings disadvantages that do not have to do with the professional area, because if one is a good professional there are no problems here. Now, as a woman, I feel that the coordination between the personal and the professional parts is very difficult, ok? It is an additional load for women. (11F).

Division of labour

The division of labour outside the house is clear: picking children up at the schools, or arriving home in time to take care of them is mostly a responsibility of the mother.

In what concerns the division of labour in the house, some informants talk about husbands (and children) "helping", or sharing the work. However, this sharing is pre-defined by the mother - she takes the decisions (13F).

The same idea is corroborated by one of our male informants, father of an 8 months old baby.

> I say I help at home, I help… there we go, a while ago I said we shared the house chores, well, sharing… she organizes, there we are again… she organizes and she tries to assign me to the tasks she knows I can do without asking her a hundred times how I should do them… We share things in that sense… (…) because, in reality, who takes care of the house and takes care of the children? The women, right? Nowadays there are more men willing to enter that game, but there is always the idea that men… well, I think I do not do as much as her, although I try to share, so as not to overburden her, but I think she does more… the house, the baby, the food, that's hers (17M)

Reproducing gender stereotypes at home

Three interviews mention that, in their own homes, there is no gendered appropriation/differention in the use of PCs.

One of them describes the situation in her family as exceptional -

> In my home, there is no difference Both my children (a girl and a boy) are very skilled with computers. But this is not the usual situation, I would say it is exceptional, it does not happen in every home…(5F, p.25).

Summary

Family and early days

- Fathers seem to emerge as positive role-models for triggering and for sustaining an interest for what is new (computers, technology, technological "toys" of all sorts) and for channelling their daughter's interests for those that are socially defined as "traditional male professions" – a label that applies mostly to all types of Engineering degrees.

- There are also indications - although not as consistent - that the role of the mothers is relevant for women to feel confident in their capacities and skills for mathematics and logic, areas frequently described as needing "innate" or natural skills (the reasoning seems to be: if the mother has the skill, so has the Self).

- Also important for triggering an interest in ICT professions seems to be an early contact with PCs – within the family, through older brothers or through parents, or at a friend's place.

- This not, however, determinant for the new generations.

Education and background

- One should be aware that, when it comes to choosing an educational area, group decisions are important for the younger – going to university together with friends seems to be important to a number of our younger informants.

- Parents influence (in the format above) seems to be more important for the older generation.

Computer use

- Having a Pc or access to one is important in triggering an interest in the ICT professions.

However, it should NOT be overlooked that perhaps more important than having a PC, is to have a PC inscribed in a relationship. It seems to be important to have someone to share it with, to learn with, to go through the manuals with.

Professional trajectories

Unexpected life transitions - jobs offered, promotions offered, change of professional area, opening up of new firms, opportunities, jobs, etc - are very important. And are specially important for the generation of women currently above 35.

This is a new area, and the coupling of an orientation to nearby areas (through previous educational trajectories) with the awareness that this was an area bound to develop in the future, with the oppening up of new market opportunities - seems to have been determinant in many cases.

Nearby areas for the generation above 35 – Mathematics, Physics, Engineering,

Nearby areas for the generation bellow 35 - Management.

Gender

> Feminists have identified men's monopoly of technology as an important source of their power; women's traditional lack of technological skills is an important element in their dependence on men. A key issue has been whether the problem lies in men's domination of technology or whether technology itself is inscribed with gender power relations (Wajcman, 2002, pg. 356).

ICT professions and gender power relations

Middle to top hierarchical levels

In general, our middle to top hierarchical level professionals will say that:

- There is Discrimination at the private level, but not the public level
- There was Discrimination in the past, but not in the present
- There is discrimination happening to other people, but not the self
- There is discrimination in other enterprises, but not where Self works

In sum, they seem reluctant to admit discrimination to the self, in the present – perhaps because to admit discrimination would mean to admit being in a disadvantaged position? And a disadvantaged position in a competitive world is hard to admit?

In particular – there is agreement that:

The Availability of men is greater, and that results in more promotions and easier promotions. There is a glass ceiling in many places. When there is not a glass ceiling the availability of women has to equal that of men for their careers to exist.

Lower hierarchic levels

At the lower hierarchical levels (helpdesk professions), it is easily admitted that there is discrimination – happening currently and to the self - and that gender stereotypes still guide promotions.

ICT – education, professions and gender

The following path seems to have been followed in the case of university degrees leading to ICT professions – first, and this is the experience of women now in their middle to late forties - women were not present in a certain type of courses leading to ICT professions, mainly engineering courses.

So, most women entered more specific computer-connected courses – system analysis, informatics. Same of these were not, twenty years ago, university degrees. It was from these specific courses they had access to the labour market of ICT professions.

Nowadays women enter directly university degrees giving access to the ICT professions, and there are now several types of university degrees connected to informatics and computers.

It seems, thus, that in terms of education the problems are not very visible.

In what concerns labour and career, women seem to be entering ICT jobs, although a significant percentage still seems to vanish in the transition from college to work.

When they enter these professions, they perform the same tasks men perform, and stereotypes are not very easily admitted by our informants, perhaps not very evident to them.

Women, however, have children, and that is the big problem. A problem easily admitted by both men and women. Only women have children. Men apparently are exempt. And although nobody expects or wishes a childless world, children remain a woman's problem.

In general for ICT Professions

- Blurring of private/public categories (in what concerns hours, places, tasks).

- Total denial of recreational use of PCs (only one interviewee admits using the PC for music).

- A strong Individualisation tendency - outsourcing, no personalized space, laptops, open spaces, teams constantly altered according to the projects' needs, flexibility, autonomy, self-learning - the burden placed upon the individual is very great.

- Interpersonal skills are required, but in a context of low differentiation We-Them, and of strong differentiation I - the Other.

In other words, inter group comparisons seem to be less emphasised then interpersonal comparisons. Here, also, the burden is placed upon the individual, and cannot be divided with the group.

In such an individualised environment, within such individualised definitions of what the meaning of work is, there is little space for the development of collective strategies to deal with gender issues. Only individual solutions seem to be available.

Two (or three) sentences for 15 interviews

M1 - very young men, very strongly career oriented; a friend's influence determinant for choosing computer science, after a disappointment with the military career (friend had a PC).

F2 - very young woman, seems to somehow regret scarce contacts with other women (very few in her firm). Dwells on de-personalization of space and constant team change.

F3 - depicts her current moment as one of having accepted that family and professional engagements are compatible only up to a certain point. She has reached that point. Further professional progress/promotion difficult without "neglecting" family. Dwells lengthily on issues of own/others availability.

F4 - Older woman, low hierarchic level - lack of control, lack of knowledge constantly thematized. Computer world described through bureaucracy metaphor, and self described as totally outside the decisional process.

F5 - Life transition associated with the husband going to EUA for a PhD in computer science - she changed profession, became web-designer. Current professional success attributed to husband's help, personal merit, own beauty as an asset.

F6 - disappointment with the military career, coupled with knowing there was a future in computers, and with living in a town in the interior where there was still space for him in the market.

F7 - liked maths, did computer science, felt ill-prepared, chose Oracle because packages were pre-ready.

F8 - young woman that changed from economics to "computer science for management", now undergoing socialisation process in a big company, experiencing some difficulties and describing the company as a world of rules.

F9 - older women, studied mechanical engineering (began in Africa), discovered it would be difficult to be an engineer in Portugal, was offered an opportunity in a new Public Institute, changed to system analyst there.

F10 - describes own trajectory as lead by opportunities others gave her.

F11 - began in maths, moved to programming, then to a commercial area, describes herself as available 24 hour, regrets that sometimes only sees her son in the morning.

F12 - father was an engineer, completed a masters degree in Physics (Brazil), returned, taught at the university, there was no structure for research, she was unhappy, was invited to start a computer department at an engineer firm, after she applied to IBM, where she started with main frames, and jumped to consulting bussiness through internally supported training.

F13 - chose mathematics because of the father, changed to software engineering because she wanted a practical component, moved slowly upwards inside IBM along the years, did a MBA recently, changed to the management area.

M14 - frenetic multitask data base manager, depicts himself as constantly working, even when not at work, and as a barrier preventing virus to invade the system.

F15 - (designer in a magazine) criativity is her main theme. She talks about how both the architecture of the programs and/or her lack of adequate training to work with them may constrain criativity.

Biographical Interviews in United Kingdom

1. Basic Information about Informants

This document reports on biographical interviews conducted with 20 informants, 15 women and 5 men. Their basic information is summarised in Table 1 below.

Table 1: Informants' basic information

Initials	Sex	Age	Marital Status	Children	Job title
AJ	F	42	Divorced	None	Head of Excellence, Bank IT Division
AM	F	37	Divorced	One boy, 7.	Head of Product Management, Telecoms Company
BO	F	41	Married	None	Product Manager, Telecoms Company
CH	F	48	Married	Two teenagers.	Systems Admin Manager, Perwill
DT	F	33	Cohabiting	None	Senior Technical Designer, Genie/O2.
EG	M	37	Cohabiting	None	Freelance IT contractor
GL	M	45	Married	Daughters 18 and 16	Business Development Director, E Centre.
JO'C	F	26	Single	None	Site building team leader, online information provider.
JT	F	39	Divorced	None	Technical Sales Leader, IT Software company
KB	M	46	Divorced	Daughter 13; Son 11	Director, Silken Thread Software
KM	F	41	Cohabiting	None	Head of Security, Telecoms Company
KS-B	F	34	Married	One boy, 2	Director, Information and Technology Services, Trade Association
PB	M	38	Single	None	Legacy Order Manager and European Pricing Manager, IT Hardware and Software Company
PM	F	26	Single	None	Systems development manager, MWB Exchange
RL	F	52	Cohabiting	None	Retired, IT Help desk operator, Insurance Company

RT	M	59	Divorced	Daughters 29, 25, 22	External Relations Director, E-Centre UK
SB	F	40	Divorced	Daughter 20; twin sons 17	Senior Lecturer in Computing Studies
SK	F	45	Married	None	Service Delivery Manager, IT Hardware and Software Company
SM	F	41	Single	None	Senior IT Support specialist, printing company
SP	F	55	Married	3 grown daughters	Independent consultant.

2. Significant Others: Education and the Influence of the Home

Parental influence and the role of significant others has been demonstrated by educational studies to be decisive for the progress and level of achievement of pupils at school. Similarly, parental and family influence appears to be one important and early factor shaping people's decisions to pursue scientific and technological subjects, in school and later. We investigated whether there were people in the lives of the interviewees who were important for their choice of job or for their career.

2.1 The family and the community

Some informants had special encouragement to go into science and technology from their parents, for example, BO, KM and AM whose parents were teachers and put a high value on science for different reasons. KM's parents were teachers of humanities and discouraged her from going into this field because of the poor pay and prospects. Her older brother was encouraged to do physics and she took her lead from that. KB's brother studied chemical engineering and he similarly followed that lead. BO's father was a science teacher: "My father had done physics at university and so was keen for me to follow in his footsteps." RT's father was a dentist and passionately committed to science. He believed that studying science was necessary in order to be equipped for the jobs of the future, and RT showed an early and steady aptitude for science subjects.

PB's father was an electrical engineer who involved him in domestic experiments, and from the age of eight he knew he wanted to work in a similar field. He was the most focussed on an IT career from an early age of all the UK informants.

At the other extreme were informants like KS-B who were discouraged from any kind of educational attainment. KS-B is of Indian ethnic origin and, as it was expected that she would simply marry and have children, her education was not considered important. However, this gave her a strong motivation to pursue her education despite her parents. Her teachers in late secondary education were central to helping her break out of the narrow path which was set for her in Indian culture.

> "I grew up with that and as a result I became a fighter and wanted to do the opposite. I wasn't meant to go to university, but I fought to go to university. I wasn't meant to become a manager but I fought to make it to that level. All the things I wasn't meant to do, I set out to do, so I wanted to prove that I could be even better. I had a role to play in society but I chose not to play

that role and that was quite hard. It had a big influence on motivating me to get to the position that I have got to now.

For my mother, a daughter's role in life was to become a wife and mother. So that was a very difficult upbringing for me. But as men are the leaders in Asian families, they make the decisions so I was fortunate because my father made good decisions. The wider community were very against me going into education at all because it was thought that a girl went to school only as long as she legally had to go to school, which was up to the age of 16 and then she was married by the time she was 18. I didn't do that.

These teachers really helped me realise my potential, and realised that I could be an academic person, that I had the brainpower to do what I wanted to do, I just needed the time to do them."

It is equally important to draw attention to informants whose family circumstances or relationships did not remotely signal a later career in IT. Some informants had no particular support for any specific career direction from their parents (SK, RL, EG), or showed no inclination to study or work in science and technology. For some, computing was not a career possibility because their childhood and education predated the emergence of IT. Others grew up after the widespread diffusion of IT, but were not initially drawn to IT work. This group of people almost accidentally entered IT work through indirect routes. Their cases show that there are many routes into IT professions, not all of them through science and technology studies at school and university, but many involving starting work in related or auxiliary professions (such as marketing, office administration, data processing). This message emerges repeatedly from the biographical interviews.

2.2 The school

It is striking that a number of women informants who have reached very senior positions attended all-female secondary schools (KM, BO, AJ, AM). All report having had a very strong aptitude for science subjects, and having had plenty of encouragement from their teachers to pursue their studies.

AJ: I went to an all-girls school, which I think was absolutely critical. I never came across discrimination at all, or any lack of encouragement whatsoever because of that.

JW: Do you think it made a difference that it was an all-girls school, that you weren't competing with boys?

AJ: I do, absolutely, absolutely. I never even thought that it was unusual for me to do maths, physics and further maths. My first day at [my first job], when we were in our induction course, we were all introducing ourselves and what we'd done. There was myself as the only woman and the rest were guys, and when you start with 'Hello, I am A…, I am from wherever and I have done three A levels in maths, physics and further maths', there were quite a few of them going 'A girl? Doing maths, physics and further maths?' I mean, I can hear them at the other end of the room. And my reaction to that was 'Well, why not?' … There were never any barriers saying that you shouldn't do this.

BO: I didn't feel any reluctance to take sciences in the sixth form, because they weren't seen as boys' subjects because we were all girls.

It is difficult, however, to draw any firm conclusions from this. For every informant who had attended a single sex school there was one who had attended a mixed school and had been equally successful in reaching a senior position in IT. SB went to a mixed school and was firmly discouraged and excluded from doing science subjects, but through tenacity and returning to study later in life, she did indeed enter the computing profession. At school, she

had liked and wanted to do chemistry, but she was persuaded by a teacher to give it up at age 14, and take up cookery. Computing had just been introduced as a school subject, and she remembers thinking how exciting that was.

> … but no one ever mentioned it to me. I don't know if they just picked people to do it, or what they did. I think I would have done it if I had known about it. Because I was always interested in computing, I just didn't get any chance to do anything about it. Maths was my favourite subject then.

2.3 Personal attributes

Also striking is the reported determination of some informants to overcome difficulties or to solve problems, which manifested itself an early age and helped them to make a career in a difficult area for women to enter. AJ and her schoolfriends found themselves without three of their four schoolteachers in their final year at school, and so taught themselves their school syllabus and got themselves through their final A level examinations. KS-B was not allowed to do her school homework until after all the household chores were complete and everyone in the family had gone to bed at night, so she did her homework at night. When she performed poorly in her examinations, she attended a further education college in order to achieve the grades she needed to get into university. Against a background of being groomed for marriage and motherhood only, this was a determined act.

Another fighter against difficult odds was SB, who left school early without qualifications because of family problems, and returned to study as a single parent so that she could qualify herself to enter university. She did not receive encouragement from her parents, and her university and career decisions were entirely self-directed and driven by her liking for and competency in maths. She was one of several respondents who showed particular determination to overcome adverse circumstances in order to pursue a career of any kind, one which was ultimately based on IT.

> At the beginning I can remember walking into the room with all these people, who all looked like they were working, and I was a housewife. I thought "Oh my god, I'll never be able to do this." But I went in and I gradually made friends with people and got on really well. And in the end I came first in the class, and I thought "How did I manage to do that?" That was really nice and a big boost to my confidence.

Many of the informants – of both sexes - who took science subjects at secondary school referred to their enjoyment of problem-solving as one of the factors which encouraged them towards science.

> SK: I enjoyed the problem-solving side of things and kept working at it until I got it right. OK, you learn later on that there are stages where you give up if you haven't found out after a certain amount of time. But I did enjoy that side of it.
>
> AJ: I am much more interested in people than I am in numbers, which makes [my A level subjects] an interesting choice for me, but I think that for me it was a problem-solving process. With maths and physics, there is always something to solve, and I am very much a problem-solving type of person. We have got something to do, let's do it, let's work it out, let's make it happen.

2.4 Entry routes to computing

In higher education, informants took a variety of subjects, many unconnected with IT or even science and technology. Some informants took science subjects which would lead obviously

onto computing and IT work. In the case of older informants, these were subjects which had computing application but predated the development of computer science as a degree subject in its own right: maths with computing (BO), physics (EG and KM). Those entering higher education more recently were able to take computer studies as a degree subject (PB, SB, DT).

But, just as IT professions themselves are varied, so too are the disciplines which lead into it. Another group of informants took degrees in other subjects than computer science or IT: librarianship and information management (KS-B), marketing (AM), chemical engineering (KB) and geochemistry (RT). A third group did not study at higher degree level at all, but followed a work-based route into IT work: AJ, CH, PM, RL, SK.

Accounts of the experience of women students undertaking computer science degrees often emphasise the male culture of a science degree: the exclusionary or harassing behaviour of male students towards female students, and women's sense of being an outsider and excluded. None of the informants who took degrees in Computer Science or similar subjects reported any problems of male culture in their degree courses, in the behaviour of their fellow students or their lecturers.

3. Job Histories

3.1 Finding the Job

Our informants entered their working lives through a diverse range of routes and went into a wide variety of jobs, not all of them concerned with IT. Even those with scientific and/or technical qualifications have sometimes come into IT indirectly. So, for example, both BO and CH started work as teachers and only entered IT later in their careers. AM gained a marketing qualification and then went into marketing work. KS-B gained an information science qualification and then became an information officer working for a charity. RT started working life as a geologist who used statistical and computing methods to analyse data and subsequently moved into computing. PM's early working life was spent managing a temporary work agency. Other informants who are now in their 40s entered the labour market before the widespread diffusion of IT and the emergence of IT professions. SK, who is now 45, entered the labour market as a personal assistant in a research establishment and only afterwards found work in an IT company. AJ joined a bank, not knowing what she wanted to do for a career and having had no contact with computers at school, only with programmable calculators. SB worked with a refugee support agency and later returned to study computing in university.

Our informants' first jobs are summarised in Table 2.

Table 2: Informants' first jobs

Initials	First Job	Organisation
AJ	Cobol programmer	Bank
AM	Market analyst	Telecoms company
BO	Maths teacher	Secondary school
CH	Teacher	Secondary school
DT	Systems support worker	IT services company

EG	Business systems analyst	Telecoms company
GL	Clerical officer	Unemployment benefit office
JO'C	Analyst/programmer	Online news provider
JT	Technical specialist	IT software company
KB	Technical support assistant	Computer bureau
KM	Software developer	Telecoms company
KS-B	Information Officer	Charity
PB	Trainee software developer	IT company
PM	Office junior	Engineering company
RL	Adreamer operator	Insurance company
RT	Geology researcher	University
SB	Refugee worker	Refugee agency
SM	Publishing assistant	Research establishment
SK	Personal assistant	Research establishment
SP	Personal assistant	Atomic weapons research establishment

This indicates that there is no single route into IT work. Our informants entered the labour market via different routes, including IT, marketing, secretarial work, clerical work, librarianship and teaching. Several entered IT work directly but had had no particular intention of becoming IT professionals (AJ, KB, KM, PB).

> "I remember thinking, 'I don't know whether I am going to do electrical engineering or computer science.' I honestly didn't know. As it turned out, on my first day it ended up being computer science. I was doing software engineering and I went into a software engineering group. So I kind of fell into it."

All joined their employers after leaving full-time education. All except one were large companies which recruited large numbers of school-leavers and graduates, assigned them to IT positions within the firm, and gave them opportunities to progress into other IT positions over their careers.

3.2 The Experience

Experiences of workplaces, tasks and organisational cultures are as diverse as IT jobs and organisations themselves. There is no single or uniform picture of the experience of working in IT professions which emerges from these interviews. Even the sex-typing of IT jobs varies between organisations and over time, as the following accounts show. The first description is of Cobol programming work in the late 1970s.

> "My impression was that when I first started, there were more women around. Not 50/50, but certainly more women. And I was in a programming area, which always tends to have more women in it than an operational area. The culture was fun, supportive, very focussed on training, good team skills. And I spent probably the first two years being a Cobol and Assembler programmer and I enjoyed it. It was good work.

> It was not what you would see today. There were no PCs. We had just introduced TSA screens, but most of it was coding on pieces of paper. So you tended to talk to your colleagues because you were in teams, you were sat at your desk. It was sociable. Interestingly enough, we did a huge amount of social activity, possibly because we were all a very similar age …
>
> JW: What you describe is the absolute antithesis of the stereotype of programming now, which is nerdy and isolating and antisocial, where people don't have communications skills.
>
> AJ: Yes, I agree entirely.
>
> JW: It actually sounds a very sympathetic environment.
>
> AJ: It was great, and you are absolutely right. It can be a very nerdy environment today, but then, at that point, it wasn't nerdy at all. It wasn't seen as being nerdy and I never heard anyone suggest that it was seen as being nerdy."

This picture is confirmed by RT's account of IT work in an oil company at around the same period. In the late 1970s, he recalled that 50% of the programming and development staff in the London head office of his firm were women, whereas the operational areas were male-dominated. The company had a good proportion of women applicants for programming jobs, usually coming from university. Not all had computing degrees, some came with degrees in geography or geographical information systems.

> First of all, I think [the company] was extremely active in the 'milk round' process, and went out to universities very positively, marketing itself really, to encourage people to take part. I think it spread a net quite widely in those days. This was in head office. I am not saying anything about people who were working in operational environments. We had people who worked very closely using machine code for some of the seismic work. Those tended definitely mostly to be men. Then there was the software development and implementation and training. We had user support as well, and there were more women in there. And also, always closely involved with the computing side was a whole library and information service side. And that was very much about databases, maintaining information and so on. So I think we took a broader spread of people.
>
> JW: Did you see more women in these areas?
>
> RT: There was an element of that, but we did have close to 50% in the straight software development work, which is where we were working in languages like Fortran. So there were a lot of women and we did get good applications from women, and they were also very good too.

By contrast, below is the account of BO, who works in a major telecommunications company. The passage refers to the autumn and Christmas of 1991, when she was first employed as an 'Object-oriented Fault Correlator' which was a programming and network modelling job.

> "Something that really struck me on my first day of full-time employment, was that I went with my line manager to a conference. And the object-oriented programming guru was over from the States and we were very fortunate to get tickets to go and hear him. And he was an excellent speaker who made a big impression on me. But at the coffee break - there was this big auditorium full of people – and I thought at coffee break I will go straight to the ladies because otherwise I will spend the coffee break queuing. And I got to the ladies, and there was no one in there. And that was a huge shock to me because I was used to motorway service stations and theatres and cinemas – always spending the break queuing for the toilets. When I came out and sat down again and looked round the room, you could count the women on the fingers of one hand. There were four or five hundred people there altogether. That was what really brought it home to me.
>
> And then that Christmas the head of the unit did this roadshow and went round all his teams and did a review of the year and a look forward. And he came to Old Street and one person in the audience asked him what the percentage of women was in his unit, and he said '12%.' And then I said 'Does that include secretarial support staff?' Because, on the whole, they were females. And

> he said 'Yes.' And then he said 'But I do want to do everything possible to encourage the lady managers.' And then I noticed that at most of the meetings I went to, I was the only woman. And I saw advantages in that, because they all remembered me. They were all grey men with short back and sides, and grey suits, and they always remembered me because I was the only woman. So I found that quite useful."

And similarly, AM, who joined the same telecommunications company in the late 1980s, noticed the absence of women in the company, even in the marketing function where she was working.

> "There were no women there at all. There weren't even really any women admin assistants. There were very few in the whole building, so it was bizarre and it was just difficult to know how to act. My boss took me to one side at one point and said 'You look like a school girl', and I thought I looked super smart … and I gradually had to learn what to wear. Because I never met any other women, so I didn't know about wearing suits."

If these accounts portray a typical picture of IT working during the 1970s, 80s and 90s, then they suggest that the gender division of labour in IT work has altered significantly since the early days of microelectronics and personal computing. In the late 1970s, when the diffusion and use of IT began to be widespread, comparatively large numbers of women worked in programming; this was not yet male-dominated, but these accounts suggest that it became so during the 1980s and into the early 1990s. Certainly, this confirms other research by van Oost (1992), and others, who have shown that programming work was initially women's work which was only subsequently appropriated by men.[10] There may also, of course, be differences between sectors (banking, oil, telecommunications) in their deployment of women and men in programming work which might help to explain the strong representation of women in some programming jobs but not in others.

Informants reported their first experiences of working in IT in generally very positive terms. Many reported learning the work very fast and very intensively, 'being thrown in at the deep end', finding the work very creative, enjoying working in teams.

> "They put you in at the deep end, so what they would say is 'You have to work on this project. Just go away and do it.' There was not a lot of hand-holding. It was fun, but that's how it was."

> "It was very much sink or swim. It was absolutely wonderful training. I took the view from the start that the best thing to do was not to bullshit. If anyone rang up with a problem, and I couldn't solve it, the best thing was to say 'I can't solve this, but I'll find out how to do that.' Then just get onto the suppliers of these computer programmes to find out how to deal with things. And that worked very well."

3.3 The Tasks

As Table 2 indicates, informants' early jobs were very varied. Consequently, the organisation of their work and daily tasks were equally diverse. The major distinction that emerges from these accounts is that between those who were working in teams, and those who worked alone on programming or network management jobs. Only two informants worked alone interacting entirely with their computer screens: EG worked alone in systems design in a Spanish telecommunications company, and PB worked alone doing coding in a large computing firm. Most informants' first jobs, however, were team-based, or concerned with

[10] Van Oost, E. (1992) 'The masculinization of the computer: A historical reconstruction', paper presented to the international conference on Gender, Technology and Ethics, Luleå, Sweden, 1-2 June.

both technical and business processes, and involved considerable social interaction. AJ was a programmer in a large team, BO was a software developer in a team, DT was a software user support technician, KB was a computer user support technician, KM was doing software development work in a telecommunications research team, RT was a geophysical systems developer, and SP was a personal assistant.

This meant that while for some informants, technical tasks and skills were the only component of their daily work, most informants needed some form of 'hybrid skills' – a mixture of technical and social skills – in order to be able to do their work.

> "This company was selling its computer time, so they had sales people and they used to take me out on sales calls, so I had a wonderful training in a whole range of different aspects, covering both the technicalities of chemical engineering, computing to a fairly good degree, but also marketing, sales, presentations to clients, etc. It was an absolutely wonderful experience. We all got on well together. There was quite a good company culture in terms of getting the various teams together. I seem to remember various company parties, which was very good in terms of building up the team. I was very lucky to be there."

> "I really enjoyed it. It was very good. Particularly at the time when they were putting the new systems in, in all the different sites in the world, I got to go there and visit these places and work with the people there, and was responsible for this mix of things which literally was making sure the computer was installed properly, putting the software systems in place on the machine, making sure it all worked, and then teaching the geologists and geophysicists how to use it. So I was doing all the hybrid skills."

Others entered their IT professions through non-technical jobs and gained skills first and foremost in business processes which were only later put to use in IT work: AM was a marketing analyst, KS-B was an information officer for a charity, PM was an employment bureau administrator, and SK was a call desk manager.

4. The Present Job

4.1 Finding the Job

We are interested in whether there is a clearly identifiable and discernible professional trajectory followed by our informants during their working lives. This would tell us whether there is a particular route into and through the IT professions, and whether aspects of this route are open or closed to women.

- ***External and internal labour markets***

Our informants have entered the IT labour market, and particularly their current job, in several ways. DT found her current job through working there as a sub-contractor employed by an IT services company. PM found her job through an employment agency. These women are both relatively young and at an early stage in their careers.

Older informants are already established in their careers, and most work within large organisations with strongly-developed internal labour markets (KM, BO, PB, SK, AJ, SB). Working in such organisations seems to provide clear career paths which have taken them through their organisations from junior to senior IT professional work. Openly advertised job opportunities, a wide pool of jobs to apply for, and a wide range of potential employers or sponsors appear to have been key to their development as employees. For example, PB described his career progression with HP as "completely linear", meaning that he moved

progressively through the organisation taking a new and more senior job around every two or three years. RT also progressed steadily within the internal labour market of the oil company he worked in, often being seconded to other teams. KM moved from job to job within BT with the help of the internal recruitment newsletter: "I looked at Job News because I was a bit bored … and it always happens like that. I just pick it up one day and find an interesting job. That is always the way it has been." BO also had opportunities, presented by working in large teams needing leadership which could be volunteered for, or by being invited to join particular teams. SB progressed steadily through the grading structure of the university in which she works. SK also moved jobs as they were internally posted, or through her Job Plan and Review sessions when she had discussions with her manager which covered what she was doing, where she needed to improve and where she saw herself going in the next year or so, what she aspired to. Most of the time she moved into new and more responsible roles because her seniors saw how she performs, rather than her actively seeking them. DT has moved from role to role within her company, also often through informal routes and personal contacts.

A third group of informants have moved into their present positions after redundancy or similar major change of employment status. The IT function in RT's oil company was disbanded and outsourced, he was made redundant at age 48, and he moved through consultancy into his current position in an e-commerce user association. Similarly, SP was made redundant in middle age from a large IT manufacturing and services company, and now works as a freelance IT consultant. KB also underwent redundancy and after great dissatisfaction with his next job, decided to set up his own software company marketing his own product. RL's job was outsourced by her insurance company to an IT services provider, and she subsequently took voluntary redundancy and early retirement. All of these informants have experienced at first hand the downturn in the IT sector and have found their age to be a major factor in their vulnerability to redundancy.

4.2 The Work – Tasks and Forms of Co-operation

In general, we can say that few informants are now concerned with IT work in isolation from broader business or organisational imperatives. The majority of UK informants have moved from working on specialised IT activities to performing generic functions which use their IT expertise to pursue business objectives. For example, they may be developing or refining IT applications for business units, or managing change in IT functions, in which IT and business skills and tasks are closely inter-related. Many have moved into IT management jobs in which the technical component of their work is far outweighed by the managerial tasks they do: project management and 'people management' were two tasks that were frequently quoted as major components of IT managers' jobs.

A good example of a hybrid IT professional is AJ. She began her working life in the bank as a programmer, moved through a series of team management jobs where the teams were working on particular technical project, and is now effectively a management consultant to IT departments and staff in the bank. Her core task is to help the IT areas of the bank improve their business. This involves making assessments of how well they are performing using tools she has developed and workshops she runs, and making recommendations to them on how to improve their performance.

> "A lot of what I do is about helping them [the IT areas of the business] get creative about dealing with issues. So, for example, we spotted a weakness in one of the infrastructure support areas about how they were dealing with customers. And we have had a series of cost reduction measures recently, £97 million worth of cost reductions, so not insubstantial. And I have been

> taking a piece of that value proposition set around how do we more effectively manage small change, working with a consultant to develop a proposal about how we realise those savings. So that would be part of my brief as well.
>
> A big part of my brief is culture change. So I have championed leadership development and brand development programmes, and really leveraged them to make them happen with a lot of sustainability activity. And 20% of my time is taken up with diversity work, so all of that is about enabling people's capability and talent. And if you watch what I am saying about this role, you don't need to be an IT person to do this role at all. After the Programme Management piece I have stepped away from it completely. I am in effect an internal consultant. It is a consultant role."

KM has moved from a specialised network management role to an IT security role, and most recently to a generic Security role in a small telecommunications firm. She looks after all security, from security guards, staff security and investigations, security issues in designs for products/services. She looks for fraud, abuse, data protection issues, and opportunities for attack on systems. She has responsibility for the whole platform that her company's services are delivered on.

RT has responsibility for the governance and running of his organisation, a trade association of e-commerce users. A major task is to liase with external organisations, including lobbying groups , government departments and agencies, and other trade associations (specifically, the Institute of Grocery and Distribution, Chartered Institute for Purchasing and Supply, the Association of ID Manufacturers, Institute of Logistics and Transport). He does almost no direct computing work, but does do some project management. He spends a considerable amount of his time in meetings with other managers of his centre, and with external bodies.

PB's work is concerned with the internal order management systems in his computing company. These are master data systems: pricing, internal customer information, order entry, order management and control, warehousing, invoicing. All of the applications are run by PB and his team (which is based in Bangalore). Day-to-day, he is checking to ensure that support calls are assigned and worked and closed in line with Service Level Agreements, fielding escalations (complaints about poor service delivery which are 'escalated' because of an outcome which is unsatisfactory to the customer), dealing with technical or business queries from customers, and gradually phasing out legacy systems. Much of his current work involves managing the transition from a support team based close to customers in the UK, to managing a team based in India. Difficulties include the geographical distance and the inexperience of the Indian team relative to their UK predecessors. The Indian team should perform service delivery to the same level of service as was provided before, but hasn't yet done so. "It was always a task too far in reality. We had 70+ man years of knowledge, and they have got four months worth of knowledge. So it is not easy." As a result, he spends a considerable proportion of his working time liasing with internal customers and trying to understand their problems, including "why they feel they haven't been properly served by the group". He works with his colleagues in the Indian team, pushing the project manager of the Indian contractor company, until he gets the response he wants. So there is customer relationship management with administrators in his own company, problem and resolution management with service providers in the contractor company. When there are budgetary and therefore staff shortages, PB does coding in emergencies if required.

SK has similarly made the transition through a number of IT support functions to the management of support teams in her computing company. Her responsibility has grown as much along geographical as along functional lines, as the company is a multinational in which portions of the global market are allocated to specific departments and their managers. She

now manages the IT customer support services for the company's Finance and Administration functions in Europe, the Middle East and Asia. She attends a lot of meetings to discuss customer requirements, manages the investigation of the feasibility of customer requests and the implications of outsourcing support service work to India. She monitors the service provision on a regular basis, and where necessary makes complaints to the Indian company manager. She liases works with her peers based in the other support groups who are also reporting to her manager, and manages the day-to-day personnel in her teams. She works on escalations of customer complaints.

SB's job involves teaching and research, and she therefore does a considerable amount of project management of software research projects, as well as course management.

Although DT's work is still very technical, it involves constant co-operation with other functions in her organisation:

> If the marketing people say, we want a way to get applications to be downloaded to a device, you have to through all the technologies and work out which ones are suitable, and if it is possible, and if it doesn't quite work, how are you going to get round that?
>
> That is the research bit, and then you have to put all that together. We write technical designs, putting that all together and thinking about which devices to use. And then you have lots of meetings with the demand-side people, who talk to Marketing, who are the people who want it. And then we have meetings with Operations, because our designs have to include how they are going to be supported and be scaled up in the future, what the user experience is going to be like. So we have meetings with all the different people.

4.3 The Skills

What is clearly apparent from these descriptions of the work tasks of our informants is that the skills they require to do their jobs go far beyond the technical. Most have acquired or developed IT skills early in their careers, but as they have become more senior, their work has required more by way of management skills and the technical component of their work has become less significant. The specific management skills they typically cite are: project management, change management, customer relationship management, and 'people management' (personnel management of teams). However, their IT skills and knowledge remain important: they are necessary for these women and men to understand and explain issues under their management, and sometimes even to 'roll up their own sleeves' if necessary. "If things went really badly I could always get in there and solve a problem. Since I wrote 60% of the applications and have dabbled seriously in most of them, it does mean that you can sometimes paint yourself into a corner when you have lost the knowledge in the company and you are the only one that is left."

By virtue of being in management and in charge of teams, all our informants have considerable autonomy in their work and have to co-operate with their colleagues and team members. Many work closely with clients, mostly internal clients, through marketing, customer support or consultancy activities. None work on a solitary basis.

4.4 Working Time, Pay and Reward Systems

A widely-remarked feature of IT work, and software development in particular, is the long hours which are often worked by staff, and particularly the round-the-clock working which is associated with project deadlines. It has been suggested that this is the one of the principle reasons why women are so noticeably under-represented in IT professions: long hours and

project working is not very compatible with domestic responsibilities, and particularly not with having small children. Table 3 summarises the working hours of our informants.

Table 3: Working Hours of UK Informants

Informant	Working Hours Monday-Friday	Total Hours Per Week	Evening Working?	Weekend Working?
AM	0700-1900	60+	Yes	No
AJ	0800-1900	55-60, sometimes 90	Yes	No
BO	0830-1900	60	Yes	Yes
CH	0845-1530	33.75	No	No
DT	0900-1800	45	Yes	No
EG	0800-1900	55-60	Yes	Yes
GL	0900-1900	50	Yes	No
JO'C	0900-1730	42.5	No	No
JT	0700-2000	70-80	Yes	Yes
KB	"As and when I choose".	20-40	Yes	Yes
KM	0830-1800	Formally an 84 hour fortnight, but in practice 50-60 hours a week.	On call 24/7	On call 24/7
KS-B	0830-1830	50	No	Sometimes
PB	0700-1600	45	Yes	No
PM	0900-1800	45	No	No
RL	0900-1700	40	On call 24/7	On call 24/7
RT	0930-1800	37.5	No	No

SB	Variable, depending on teaching timetables	Also variable, but around	Yes	Yes
SK	0700-1630	50.5	Works for 30 minutes at home each evening.	No
SM	Varying shifts	40	Yes	Yes
SP	Varying hours	Varies	Yes	Yes

Few of the UK informants complained about working long hours. Indeed, some work a standard 8-hour working day, though the precise timing varied, with some working an 'early' shift from 0700 and others starting and finishing later. In comparison with other European countries, and certainly when set against the Working Time Directive, however, the working hours of our informants are long, usually between 50 and 60 hours per work. Many reported finishing work relatively late at the end of the day, and it is not uncommon for informants to work at home during evenings or weekends on a voluntary basis, using a dial-in connection to work from home computers. Two informants (one is now retired from work) were on call 24 hours a day if the need arose, although in practice this did not mean that they were working long hours. It was more that their on-call status inhibited their private lives. Others reported that their working hours are substantially extended whenever they had to travel for work, in AJ's case, 2-3 times per week.

At the level of seniority of our informants, most of whom are in management jobs, long working hours are routine rather than a function of particular project deadlines. Our informants tend to justify their working hours as being necessary in order to 'get the job down'. They are working in job grades not protected by collective agreements on overtime payments. They work long hours 'voluntarily', in other words, in order to stay in control of their workloads. This comment from BO typifies this approach.

> "I like to do a good job. I have so much to do, I work too many hours. So I guess on a typical weekday I would get in [to the office] between 0830 and 0900, and I would leave between 1830 and 1900. But then I have remote access and sometimes I leave on a Friday … I had one day off a couple of weeks ago, and the following morning I had 86 new emails. So if I leave on a Friday and my inbox is – once it gets above 100 messages I can't see the wood for the trees. I don't know what is important and what is rubbish. So sometimes I will log on, like 0600 on a Sunday morning I tend to wake up early, while my husband is still in bed, and I just deal with some of them. So that when I come in on Monday morning I know what it is I am doing, rather than wading through this and then having somebody ring me up and say 'I need to send this response to Oftel by midday, have you read it?', and me saying 'Tell me what the email is called and I will see if I can find it.'
>
> I go through periods of thinking I am just too tired and I am not going to do it anymore, and then somebody wants something from me or I think I can contribute and here I am at 7 o'clock and I haven't left the office yet."

Start-up companies seem to be particularly inclined to ask their IT professionals to work long hours. DT works in a telecommunications services company, which is a recent start-up but now somewhat established.

> In the [early] days it was long hours, much longer hours. It is getting a little bit better now because it isn't quite the start-up company that it was. But in the early days in [the company], it

was lots of deadlines, everything had to be done very quickly. So we were staying late and working late. Now it has got a little bit better, because the company has stabilised a bit and has moved away from start-up mode. But we still have deadlines, when a service is going to be launched. When our games service was launched, we were on conference calls till 11 at night. Even when we had our team dinner we were on a conference call. We had the food, then three of us had to dial into this conference call! We were in the restaurant, so we dialled in in the restaurant! An hour long conference call.

But that was the week when we had conference calls every evening. So we would go back home, have time to maybe grab something to eat, and then get on the conference calls. They started about 7 and then lasted all night. But that was only for a couple of weeks. And over the weekends.

In AM's organisation, working long hours ('presenteeism') seem to be a device by which men demonstrate their commitment to the job and the organisation, rather than strictly necessary for doing their jobs. As a single parent, she and her seven-year-old son have paid a high price for this work culture.

It is a macho thing. It is a way of saying 'We are here, we are dedicated to the job.' We would be sitting round talking all day and chatting, and then come five o'clock they would all start having meetings. You could have been efficient and done it in work time, but no. So they would do things deliberately in the evenings or at weekends when it was difficult for those with children to attend. You still get it where most of the men who have children, their wives are at home with them. Because they are in good jobs, they can afford to do that, so their wives are at home. They don't have a problem – their children are looked after. They don't have to worry about getting back. They are not seeing the children either, but that is not an issue for them because they have got someone who loves them who is at home. Whereas I have got a nanny who is at home because I am a single parent.

On the work-life balance issue, my son (he is 7 and three-quarters now) came running in the kitchen the other day and said 'Mummy, mummy, mummy, there is fantastic news.' He had been watching the news and they had been talking about flexible working and he had listened to every word, he had picked it all up and he came in and said 'They are going to introduce a law in April and it is called 'flexible working' and it is so that all the mummies and daddies can spend more time with their children. Isn't that wonderful, mummy?' And he gave me a big hug and I just thought 'Oh gosh, it is so hard'. And of course it is only for children under six anyway. And of course at this level [of seniority] you have got no hope whatsoever of getting any flexible work or time or anything. You would just be sacked.

There are no part-time workers here. All the women who go part-time are soon edged out. There is just no tolerance of it whatsoever. It is when you get past a certain level, you are playing with the boys. They are all serious about their work, they are all doing long hours and they expect you to be the same. My boss's boss here, he works through the night. He has got a family, he has got a wife and children, though I think he is pretty much separated from them. They live in a different part of the country, and he is one of these people that only needs a few hours sleep a night. So he works through the night, and will be sending emails at midnight. You can send him an email at any time and he will respond back. It is just that culture of 'you must be available at all times'. It is very difficult.

PM has rejected this culture, having seen how little it repays the employee:

My hours are less now. I won't sit here till 7 o'clock at night, 8, 9 o'clock at night. I won't come in and work on a Saturday or a Sunday. Because it is just exhausting. And it is a bit sad. I want to get out and see my friends and enjoy my weekends.

> With the redundancies that are being made, I have seen people who have slogged their guts out working ridiculous hours, Saturdays and Sundays, being made redundant like that. And you think "I am not putting myself in that position."

All informants were paid a basic salary which was augmented by a car allowance and a bonus based on company performance. Basic salaries ranged between £32,000 per annum and at the top end, £90,000.

BO points to a phenomenon which indirectly discriminates against women and creates pay inequality, because of the timing with which they have been entering IT work.

> "This is something about being a woman in IT, actually. The time I joined [my company] at the beginning of the 90s, [the company] had just finished the two pay rises a year, regardless of what your performance was. And I and a number of women joined around that time, and we missed out on these twice-yearly pay rises, progression up the pay scale, and we just got stuck where we came in at. We had a year with no pay rises, with the company trying to downsize because the market wasn't good. The following year there were very small pay rises. The year after that … So this summer when there were no pay rises, my manager was asked to put forward cases of people who were performing well, but were being paid significantly less than their peers. Now the thing about personal contract is that the pay scales aren't published and you only know what somebody else is earning if they tell you. The union do a survey every year and they publish the information they get, so they have some idea.
>
> And I have been aware that colleagues of mine, performing at the same level, because they have been in [the company] longer, earn significantly more. In each promotion, I have got the maximum pay rise which is 10%, but 10% of not very much is still not very much. I feel like I am never catching up.
>
> If you look at the statistics across [the company], women are discriminated against because women have only fairly recently come into IT and telecommunications, and we missed on the just-keep-going-up-the-pay-scale."

4.5 Informants' evaluation of their situation

Most informants felt comfortable with the type of work they did, and competent to perform it. Three female informants, however, identified specific problems in relation to their employment situation. In both cases, the problems concerned the culture of the workplace which made their personal situation as employees and mothers difficult.

KS-B reported hostility from her (female) colleagues when she found, very shortly after joining her organisation, that she was pregnant.

> "I thought I could handle being pregnant, but when I started work my life was made very difficult by the staff in the organisation. They were very anti- the fact that I was pregnant, they thought that I was taking advantage of the Association by getting a job and knowing that I was pregnant. I didn't know that I was pregnant. I did point out that if I had known, I had been in [my previous] job for four years, I would have stayed and got all the benefits I deserved. I didn't get any benefits here. I came back to work after 6 weeks, well, I actually came back to work after 3 weeks and worked from home, and came back to the office after 6 weeks. I just had to prove that I could do it!
>
> Having a female team, I was surprised at their attitude towards me. A lot of them aren't married, or they have a partner, but they are not committed in any sense to a family, and they don't appreciate what it is like to be in the situation that I am in, and I find that quite disturbing, because you always expect sympathy from the same sex. There isn't any. I was surprised that women are actually worse than men when it comes to family, and things like that."

AM also found the culture of her workplace hostile to working mothers, but in this case, the workplace had a 'macho' culture in which men dominated and in which family life was simply not recognised.

> "I don't have photographs of [my son] on my desk, or anything like that. I have been here a year, and it was only [last month] that I told anybody that I have a child … I keep it all very quiet because it has been used against me in the past. So it is not something I talk about. It is seen as a negative thing, and I have seen it used lots of times actually."

SB, who works in a university, found herself the subject of bullying from one of her male colleagues, who attempted to strip her of responsibility for teaching a module she herself had developed for the degree course. This seemed to be part of a general campaign of victimisation by him of her. Institutional and trade union support were non-existent, and she had to handle the situation by herself. She ultimately gave up her battle to keep control of the module she had written.

> I have been on the [receiving] end of quite a bit of bullying over the last two years or so. Now I know who the instigator is, and he was going around messing up my job. It is the Head of Division, between the Head of Department and me.
>
> He was very supportive and we become friends because we were teaching on the same things. I thought we had a good working relationship, got on really well. And then it has just seemed that he has turned against me, but I don't really know why. He just got at me through other people mainly. I was teaching management stuff before, and I am not teaching management stuff any more. I have just been gradually pushed out, by him persuading other people to call into question what I am doing - very simple things, but when it is over a period of time and they talk to other people, it is really insidious.

All informants reported burdens of different kinds associated with their work. Aside from the difficulties of achieving work-life balance reported by KS-B and AM, other burdens included:

- Not having adequate resources to do the job but being personally blamed for poor performance.
- Having to implement company strategies which involved making difficult decisions and harming colleagues. When his company outsourced the provision of IT services to India, PB had to lay off his UK-based team. He then had to work with the new contractor, an Indian company inexperienced in providing this service, despite its geographical and cultural distance. This was a very stressful period and his relationship with his partner broke down around this time.
- Being 'displaced' because of a change of company strategy and the restructuring of departmental or team activities. Six informants have experienced this. Three had to reapply for their jobs and were successful, but one found the culture change very negative and decided to leave the company. The fourth found her job outsourced to a contractor company, and again found the culture change very problematic. She took early retirement after a year with the new company, aged 51. A further informant, male, found a job with a small consultancy shortly after being made redundant, but much less influence and prestige than he had enjoyed in his previous job. This event, in his middle age, appeared to mark the beginning of a decline in his job security and career development. A sixth informant, also male, set up his own company upon being made redundant, delivering software services to the UK market using IT professionals from India.

5. The Private Situation

In Table 1 we summarise the data about the informants' private situations, which shows that informants' had a mixture of living arrangements, from living alone, to cohabiting with a partner, to living with a spouse and/or children.

Some female informants who had children found their childcare responsibilities very difficult to reconcile with their work, both because of the actual demands of the job, and also because of the hostile culture of their organisations. Male informants reported no difficulties with childcare, and having children did not appear to be an issue which impinged on their working lives.

Of those living with a partner, only one reported lack of support from the partner, but for her caring for their child rather than for her work. Paradoxically, he had fully supported her move into professional IT work and encouraged her in her career, but in practical terms he did not support her by sharing the burden of childcare equally with her.

6. Work Culture

6.1 Inclusion/Exclusion

Work cultures varied strongly between the organisations for which our informants worked. The computer services company for which PB and SK worked was experienced by them as inclusive and supportive, despite the fact that it was undergoing a merger and an organisational restructuring in which people were being made redundant. They were strongly supported, and felt appreciated for the work they did. SK was at a level where she herself set the cultural tone of the workplace, at least locally, though recognised that it varied considerably according to work location. PB is particularly loyal to the company because of its support for him during a long period of sickness leave which he took very early in his career with it. "The company was fine – brilliant – so that is one of the reasons why I have always fought for this company, because they have done well by me."

Other supportive organisations were DT's telecommunications company, and RT's and GL's e-commerce trade association.

Many organisations display an unsupportive or exclusionary work culture. SB's university department is marked by a culture of bullying and victimisation from which she has personally suffered. In KS-B's trade association, the work culture is similarly unsupportive and characterised by a interpersonal animosities and lack of co-operation. People are not ready to work outside of their job areas, a typical attitude being "That is not my job, how dare she ask me to do that?" BO noticed a similar lack of co-operation which she thinks is a male cultural attribute.

> "One of the things I noticed coming into [my company] in a largely male environment (the area I am in now is more mixed, I would say it is about 25% women rather than the 12% when I joined), is the different styles that men and women have. I would go to all male meetings, and it was like 'I am not budging an inch' and 'It's your fault' and all this back covering. I couldn't be doing with all that and so I bring the female style 'Let's co-operate, never mind whose fault it was. Where are we going to go from here?' And I very much have a style of supporting and protecting the people who do things for me, and then they do it for me."

In AM's telecommunications company, the culture is also individualistic and is characterised by 'back-stabbing' and sackings.

> In this company, I have been under threat so many times, and I've survived four times. I have only worked here a year, and it is one of the more unpleasant companies. Lots of undercurrents, lots of relationships going on, lots of politics, and a dislike of marketing. It is not so much of women, it is of marketing, so anyone who is in marketing or sales is a second-class citizen.
>
> I think we have had six marketing directors in the last few years. All my colleagues have disappeared. I had four bosses in four months at one point while I was in the same job, so they were all sacked, one after the other in a four month period. So that gives you an idea. It was just company politics. One guy tried to get round his boss and failed, so they got rid of him. The next one lost out in a power struggle at the top, so he left. Then I worked for Phil, who is the one who never sleeps at night, and then he put in one of his boys, who is less qualified than me, in charge above me."

Language can serve to reinforce a sense that there is a dominant male environment in at senior levels in IT, in which women largely play a support role and can be patronised, as these comments by AJ indicate.

> "I do see an old boys' network, and I do find that that is exclusive, and I have worked really hard to help overcome that for other people. I see teams where Exec have all male teams, where they call their secretary 'love' and 'dear', and any other woman, including me, that they come across, they call 'love' and 'dear'. It is that kind of … It is nothing specific, it is just generally that I find that exclusive. We were talking before about that dominant environment. There is that boys' club. It does exist. I see it at Senior Exec level.
>
> Has it stopped me getting places? That is a hard question to answer. I don't know. Maybe. Has it stopped me doing the things I have wanted to do? No. Maybe I could have progressed further if that hadn't existed. That is quite possible. And hopefully, some of the work that we have done in Diversity has paved the way for others to break through those barriers."

BO also found language and humour excluding, and noticed that women who were exposed to it simply withdrew into another work space in order to get away.

> "[In] this other team, there were four men and everything I said was turned into sexual innuendo. I asked if somebody had a rubber – meaning an eraser – and, you know. It was just one thing after another. And it was extremely odd because the guys were nice, and I quite liked them. But their boss obviously condoned it, though he didn't seem to take part. And there were a couple of women in the same unit, and I suddenly realised that they were working two bays away because that was what they decided they needed to do!"

KB describes a previous job in which there was an informal work culture much like that of the prevalent image of IT work and particularly work in young start-up companies. In the end, he experienced this as exclusionary because it created inefficiencies which undermined his professional identity.

> It was interesting, a totally different culture. Young crowd. I was probably one of the oldest there. Pleasant, informal, more formal than [other companies I had worked in], but less formal than the engineering organisation that I had been working in for the previous 15 years. One thing that struck me was that they didn't have the first idea of how to manage projects. In fact, a lot of their senior managers didn't really see much of a need for a project manager, although they couldn't say that. Their view of the project manager was that the project manager was there to help the salesmen tot up the hours that their consultants spent on each project, to produce a bill. The project manager wasn't supposed to interfere with how their consultants actually did their work.
>
> It seemed to me to be much more of an academic institution than a delivery mechanism, and what that meant was that their projects went horribly wrong. And they knew they were going horribly

> wrong. And the senior managers were trying to sort things out, but the consultancy managers were quite keen that their staff could carry on doing things in the way that they had always done.
>
> I suggested various initiatives and managed to make some headway, but in the end it got to be less than positive for me. I have very strong professional pride in what I do, and if I can't do it to the best of my ability, I get very demoralised. So in the end, I decided to leave. They didn't want me to leave, and they sat on my resignation for three months until I told them that they couldn't do that.

So work cultures are organisation-specific, but also location-specific and even team-specific. Moreover, as the contrasting experiences of our informants show, there is no pattern that private companies have competitive, unsupportive cultures, while voluntary or public sector organisations have collaborative, supportive ones.

Work cultures also change over time. AJ has worked in the IT function of a major retail bank for the past 25 years, and found it a very supportive environment, but she has recently experienced a culture change which has led her to leave the organisation. Creativity and individuality is now discouraged, and there is a punitive managerial approach to personal expression.

> "I have had great support, generally speaking, and there are a couple of people in particular who have been absolutely brilliant. This year has been crap. Can you write down 'crap', please?
>
> It is probably this year when the culture has been less tolerant to … creativity … My creativity as an individual has been supported, and now it isn't, I don't have that opportunity any more. And I do think that that individuality and that creativity is partly what Diversity is all about. And that isn't particularly supported any more.
>
> I have to tell you a story that is just typical of the culture, and it is one I picked up today from two people. We have a clean desk policy at work. Absolutely right, you shouldn't leave papers out, it is a security issue. There are all sorts of contract staff wandering around, particularly cleaners or whatever. I am not criticising cleaners, but … So the clean desk policy is that you clear your desk away. Absolutely spot on, I don't have a problem with that. But the clean desk policy now includes clearing your desk completely, and anyone who leaves photos on the desk will be subject to disciplinary action. I couldn't believe that. I heard that today and it just gobsmacked me, to use a good northern phrase. This is the kind of stuff I hear when I go in now. It is like – you can't be serious. Sure, take away the important stuff, but photographs of your children?!

Gender Issues

The gender cultures of workplaces were most noticeable in relation to working hours and male behaviour in our informants' organisations. Perhaps the most pronounced example of 'macho culture', which we have discussed above, was AM's organisation and the commitment which was demanded of staff such that women with domestic responsibilities found it almost impossible to participate. Two other instances are highlighted here, one a case of male humour which offends and excludes women, the second a case of working hours being arranged in a non-discriminatory way.

In BO's company, sexist and racist humour by managers was an accepted and traditional part of staff conferences, something which left her feeling very upset. She complained to HR management and got the practice stopped, with the support of a male trade unionist and male manager.

> "Then the evening entertainment was a meal in the hotel, and one of the direct reports of this head of unit stood up at the end of the meal and told a joke that was vaguely disgusting, and I thought "OK, not my sense of humour". The next joke was racist, the next joke was sexist, the next joke

after that was frankly obscene. And I thought 'I am not going to sit here and listen to this', so I stood up and I walked out…

I was really upset, so I rang a guy in my team who had long experience as a union rep and I just talked it through with him. I rang my husband and talked it through with him, and I thought 'I am going to do something about this'. And the following morning, the woman who had organised it cornered me at coffee, and she said 'I saw that you weren't happy last night with what was going on'. I said 'Too right'. She said 'You are not the only one, but please complain, because if you don't complain I can't do anything about it'. Which led me to think it had happened before.

So we had an anonymous feedback web-page after this event, and there was an appropriate place where I could complain about these racist, sexist, obscene jokes. But because it was anonymous, I then cut and paste that bit and sent it direct to the woman who was organising. And at the same time, the BT Women's Network ran an event where they got a union speaker to talk about bullying and harassment in the workplace, and I talked through with them what my experiences were and what I wanted to do about it and they were very supportive. So I realised it wasn't just me being prudish, I did have a genuine case.

I cut and paste this text and sent it to the woman organising the event and I said 'I want a response to this or I will escalate it'. And it disappeared into the ether, but I let my manager know what was going on and he supported me. And interestingly this web site, all the anonymous comments that they had received over the last couple of years or so were all up there in no particular order. And I just browsed through them, and I eventually came across an entry from a woman who said: 'The after-dinner entertainment led me to believe that women do not have a place in this organisation.' And I thought 'It has happened before and they have done nothing about it.' And eventually the Head of HR for the unit rang me. He made some pathetic excuse about why this manager had behaved like this: 'He was on antibiotics and he drank a glass of red wine', which annoyed me. But he said he had been spoken to, wouldn't apologise, but he had been spoken to and I was assured that it would never happen again."

Office social rituals can also be redolent with gender relations. In RL's computer services company, there was a very impersonal (and, it could be argued, masculine) culture which she challenged when she joined the organisation. She tried to make the office more homely with plants and Christmas decorations, perhaps playing a 'motherly' role:

They were just a strange lot of people. … They didn't like you laughing. A good instance was, they had never had a Christmas tree in the office we were put in. I brought the Christmas tree from [our previous employer] with us, and I put the Christmas tree up on 6 December. I put it on the desk and put lights on and balls, and one of the managers came along and said 'We don't have Christmas trees in here'. And I couldn't help it, I said 'I am sorry, you do now'.

We took about ten plants, and they didn't know what was hitting them. And someone said to me "Where are you putting all those plants?" I said "On my window sill, on my desk". They wouldn't have them. But by the time I left, I had scattered them round the office and no one said anything, even the men. Even the men were actually watering them.

PB's and SK's company which appears to have successfully developed a culture and practices which are more women-friendly. PB, who is himself a manager, has had more female managers than male managers. He draws attention to the company's working hours policy which he believes contradicts the notion that the IT sector is characterised by long hours or inconvenient working time arrangements which discourage women from entering the IT professions.

"You said that you feel that one of the potential reasons why more women aren't coming into the industry is working time. Well, in that case we have always been terribly enlightened here, because we've always had a flexible working practice arrangement. It is basically between the

> manager and you. I've had contractors that work one or two days a week from home. I have had a contractor that works permanently from home. We've had people come back part-time, we've had job sharing. I work from 7 in the morning till 4 in the afternoon."

As far as gender divisions of labour are concerned, men and women dominate in certain areas of IT work in some of our informants' organisations.

In telecommunications, there is a sexual division of labour lower down the hierarchy, below managerial grades. The people that climb the telegraph poles and go down the holes and install phones – the engineers - are men. Software engineers are also almost entirely male, because they came from electronic engineering and physics backgrounds before computing degrees were available. The secretarial support staff, admin and call centre staff are usually female.

In his IT services company, PB has found that there are more men than women in code development, and more women than men in operational support, which he attributes to the interpersonal nature of the work. But in her retail bank, AJ found more women in programming and more men in operational areas.

In KB's previous organisation in which he was an employee before he established his own company, women were not rare. The Systems Analysis Group was female-dominated, and programmers were 30-40% female. However, there was low female representation in senior management and in sales, a pattern also noted by PM in her organisation.

7. Further learning

The accounts of our informants suggest that opportunities for further learning seem to be strongly influenced by the size of the organisation and its ability to command a training budget. It was only those informants working for large organisations who access to training and learning opportunities.

7.1 Training and learning

AJ had extensive formal training and learning opportunities throughout her career of 24 years with the retail bank. These were built into her job, and their purpose was to equip her with necessary skills for the job, and to develop her skills to prepare her for future, more responsible roles within the same company. When she joined the company after leaving school, she had seven weeks of in-house induction training to prepare her for her programming role. Four of these weeks were spent 'in the classroom', then after joining a project team, she took the next three weeks of training in the classroom. Until recently, all training in this company was handled in-house, but it has now been outsourced. The training budget has also been cut.

Later in her career, she applied and was successful for an IT Management Development Programme. This was a three year programme, of which the first 6 months was spent working in branches, which gave her an understanding of the business and the experience of the internal customers. The next 6 months were spent as Technical PA to the IT Directors. This put in context the decisions that they had to make and what they were doing. The second and third years were spent in New York project managing the installation of an office system across North America and Canada.

AJ's bank has recently inaugurated a company university, which is a self-learning institution. All staff are given several hundred pounds to go and use it how they want to in their training, provided they fulfil certain performance criteria to gain entry to the scheme. Mentoring is also offered to staff in management positions, through an in-house Career Development Programme.

Other informants reported having had role-specific training earlier in their careers, but being too busy and pressurised to take advantage of training now, although the opportunities were on offer. Both AM and BO benefited from their telecoms company sending them on a Women in Management training course offered by Cranfield University, an institution which specialises in providing management training for organisations. Both found the course very important in augmenting their understanding of how to develop themselves and to prepare for management positions. They both reported gaining considerable confidence from this course. The same company paid for management staff, including AM, to undertake an MBA or MSc on secondment from their jobs. It also operated a Women's Network for women in professional and managerial areas. BO described how just the Women in Management course preparation material increased her self-confidence.

> I looked at all the information about the course, and I applied for it and I got accepted. But then the deadline for applying for this job occurred before the first week, but just having read the material and having been accepted on the course, I thought "I am going to apply for it". Because it was talking about women looking at a job advert and thinking "I don't meet 2% of it, I am not going to apply", and men looking at a job advert and thinking "I can't do that but I can bluff my way through that. I can't do that but I don't expect it is important. I will apply". So just reading the material for this course gave me the confidence to apply."

Also working in a large company, RL has been able to request for a place to be paid for on short external courses in software applications throughout her career with her insurance company, providing she could show that these were relevant to her work as a call desk team leader. Training opportunities such as these have been plentiful, though she has not always been able to use the skills acquired in her work.

In their computer services company, PB and SK have both had management training in order to provide them with the necessary skills to perform their current management roles. They find it hard to find time for training for non-essential or purely development purposes.

On the other hand, those informants working in small organisations or as sole traders have little opportunity for training and development. EG teaches himself new skills by reading books and other literature in his spare time. KS-B feels very under-developed in her small trade association, as financial constraints prevent her from taking the training which she would like to take in order to do her job properly. PM has not received any training for her work as a systems developer, which she has learnt by doing. Training is not given resources in her organisation. DT reports that in her organisation, there isn't any formal training, mentoring, or employee development. She and a colleague asked to go on a technical course for Java, and eventually after several requests, they were sent on this course. SB's university is cutting expenditure and staff, so there is no money for training, nor for conference attendance. Even if she has papers accepted, she can't get financial support to go.

7.2 Development and Progression

Despite apparently excellent training provision and preparation for management in most of the large organisations, progression and promotion practices were sometimes very

discriminatory. Three instances of favouritism by male managers in favour of male colleagues were related by different informants; in all cases, these women had to struggle to gain proper recognition for themselves in order to get promotion or regrading. Two succeeded, AM did not, but protected herself from being sacked.

> [My boss] said, 'You can apply for the job, but there is not much point, so why don't we just talk about [severance] money now?' I said 'No. I am going to apply for the job.' I was absolutely horrified. Everyone was saying to me 'Oh I hear Nigel has got the job', and I said 'Well, we haven't had the interviews yet'. Suddenly Nigel pops up on committees that I thought I would be on. Suddenly he is appearing at meetings that I thought I was going to. So it was fairly obvious he was already the chosen person. And I had my interview which was postponed four times. It was supposed to be at 11, then 12, 2, 4 o'clock. Eventually I had it at 7 o'clock at night, having waited all day for it. He hadn't read my CV and asked me all these obscure questions. And at the end of the interview I said 'Let me tell you something about myself', because he clearly didn't know anything. I went through what my background was and he was completely shocked that I had all this experience, had worked in so many companies, had launched this many products. I had worked on some of the products that he had admired in other companies. And the next day I got a call from another guy who had also gone for the job, who later left the company, and he said to me 'You have to think of it as you have won the race, but the prize has already been awarded to someone else.' And then Nigel got the job and was instructed that he had to keep me. But if I hadn't done that, then I would have been out. I impressed him, but he had already given the job to someone else and it was a done deal. That is life, and that is the old boy network.

And in AJ's case:

> I might have been the most senior woman in IT, but I was managing a team of 40, managing a budget of about £20million, big global responsibilities. I had a colleague who was managing a team of 40, with a budget of about £20million, with UK responsibilities. He was a grade higher than I was, and I had to fight really hard to get my grade to be recognised the same. What should have happened is that my line manager should have looked and said 'Yes, we should generically group your grades together.' He said 'No, they are not the same.' I went through a job evaluation process … he managed the Tandem team and I managed the VACS team … for every word that said 'Tandem', I just crossed it out and put 'VACS' in, and resubmitted the whole thing. It came back with higher points but still on that lower grade. I was then about to go to the next step of appealing against it when my line manager walked and said 'I have discriminated against you. I am sorry. It is not just because you are a woman, it is because of your age. It has taken me a little while to realise that, and I am going to fix this now.' And ever since then, he became a really strong advocate of equality and diversity, like someone switched the light on for him.

BO had the following experience:

> "My immediate boss decided to go for early release, and there was a guy in the team at my level. When I joined the team he had been there about a year. He got on very well with this manager, and I could see that the guy who was going to leave was grooming this guy to take his role. And because of personality differences, I thought 'There is no way I can work for my colleague, Dave.' And I saw Dave angling his way into this Acting Head of Team role, and I could see my manager who was going to go, grooming Dave to take this on. So I thought 'Right, I have to do something about this before it happens.' So I went to John, the guy who was going to go, and I explained to him. I said 'I think you are going to get Dave to take your role and I am going to report to Dave', so John said 'Yes, spot on, you've sussed it.' And I said 'There is no way I can work for Dave', and he was really shocked at that. But I just explained why. I said 'It is just a personality difference'. And he said 'Oh, OK'. And he was really keen not to lose me and he said 'I am sure we can work something out. I will talk to Andrew [who was his boss] and we will see what we can do.' So by the time John left, I was given what was left of the number change programme to run to conclusion, and Dave was given everything else, and the other people in the team had to report to him, but I was a singleton role reporting directly to Andrew. And some of the other

> people said 'That's not fair', and I said 'Well, I saw what was happening and I sorted it'. So then John's post didn't get advertised, because again there was another cutback because Dave thought 'When John's post is advertised, I am doing it already, I will be at the front of the queue for getting it.' And it wasn't advertised, so Dave got fed up and went to a completely different unit. And then there was a reorganisation and the post was advertised, and so I applied and got it. So I am now on PGCT grade. And when I got that promotion, Andrew said to me 'Your first job is to recruit a team', so I did and that is the team that I now run."

DT's telecommunications company is a young company, and has not developed systems for progressing staff. It appears to her that politicking is the best way to advance your career, something she considers unproductive and unattractive. So her promotion prospects are poor. PM similarly has no progression opportunities, as she is working in an isolated area of the company with no line management. She would have to leave her company if she wanted to progress. In SB's university, promotions are frozen, and SB is searching for other jobs. She thinks she wouldn't be a first choice for an IT job because she doesn't have a 'traditional' background. And there are problems for all these UK informants who want to progress in their careers: moving out of their current organisations is difficult because the IT job market has contracted enormously in the past two years, and there is significant competition for jobs.

Annex 2A: key data sheet

NAME/CODE	
AGE	
PRESENT JOB (JOB TITLE, POSITION)	
SHORT DESCRIPTION OF TASKS	
WORKING HOURS	
SALARY (NET INCOME PER YEAR)	
TYPE OF COMPANY (NAME AND SHORT DESCRIPTION)	
FAMILY STATUS	
CHILDREN (NUMBER, AGE)	
RESPONSIBILITIES IN THE FAMILY/SUPPORT (SHORT DESCRIPTION)	
EDUCATION: SCHOOL TRAJECTORY	
JOB HISTORY (YEAR, COMPANY, TYPE OF JOB)	
FURTHER EDUCATION (YEAR, TYPE)	

Annex 2B: WWW-ICT Coding scheme for biographical interviews

Guidelines

- We have tried to use descriptive categories, as far as this is possible
- 'Does not apply' means 'this is not a relevant category for this case'
- 'No answer' means 'was not addressed in interview'
- '**Specify**' means 'put in short description which will be coded by us'
- 'Summary description' – please try to characterize respondent in one sentence
- 'Life themes' – here we try to capture the diversity of life themes but also commonalities – please add to list
- Please use the following code: BIO / country code (A; B; F; I; IR; P; UK) / Gender (F; M) /number (e.g. BIOAF11)
- It would it be helpful if you could insert the previous short coding scheme that you already filled in here so that we can easily merge the two schemes.

PLEASE INSERT PREVIOUS CODING SCHEME HERE

NAME/CODE:	SUMMARY DESCRIPTION:

CATEGORY	SUB CATEGORY	VARIABLES	APPLIES	DOES NOT APPLY	NO ANSWER
BACKGROUND	Home environment (childhood)	Countryside			
		City			
		Large family			
		Small family			
		Growing up with boys			
		Other, **specify**			
		Profession of parents/educational level: **specify**			
	Significant others (influence on career choice)	WHO: **specify**			

		HOW: (If there is more than one, please fill in for each of them) • Role model			
		• providing computers/expertise			
		• encouraging			
		• discouraging or communicating anxiety			
		• Other, **specify**			
	Critical life events	Special experiences: **specify**			
		Life changes: **specify**			
		Other, **specify**			
	Career choice	Independent/on their own			
		Against expectations of the environment			
		Focused versus			
		'By chance', accidentally			
		Motivations (salary, interesting field, etc.): **specify**			

CATEGORY	SUB CATEGORY	VARIABLES	APPLIES	DOES NOT APPLY	NO ANSWER
CAREER PATH	Ruptures/ career breaks	Not having finished degree as career break			
		Maternal leave			
		Wrong career move			
		Change of profession: **specify**			
		Renouncements, regrets: **specify**			
		Other: **specify**			
	(Not) getting promoted	Support from mentor			
		Has to do everything herself			
		In a dead end position			
		Other: **specify**			
	Steps ahead, plans for the future	*In terms of work*: • Have more to do with clients			
		• Move into project coordination			
		• Move into project acquisition			
		• More conceptual work			
		• More design activities			
		• Other: **specify**			

		In terms of career steps: • Gain a leading position			
		• Change employer/company			
		• Get self-employed			
		• Go abroad			
		• Other: **specify**			
		Requirements: • Additional training			
		• Longer hours of work			
		• Other: **specify**			
	Constraints	Lack of career possibilities			
		Higher positions not seen as attractive			
		Lack of support			
		Age			
		Lack of degree			
		Other: **specify**			

CATEGORY	SUB CATEGORY	VARIABLES	APPLIES	DOES NOT APPLY	NO ANSWER
PERSONAL LIFE	Living arrangement	Alone			
		With: **specify**			
	Has a partner				
	Relationship with partner	Partner close to her field of work			
		Supportive of her career			
		Critical of her professional commitment			
		Other: **specify**			

CATEGORY	SUB CATEGORY	VARIABLES	APPLIES	DOES NOT APPLY	NO ANSWER
WORK SITUATION	Quality of working conditions	*Salary*: • Adequate			
		• Not adequate			
		Contract conditions: • favourable			
		• unfavourable			
		Flexible working time			
		Arrangement of flexible working time, **specify**			
		High levels of stress			
		High work loads			

		High level of discretion/freedom			
		Total availability required			
		Other: **specify**			
	Tasks – responsibilities	Can deploy her skills/competencies			
		Has opportunity for learning			
		Role overload/too difficult work assignments			
		Other: **specify**			
	Cooperation at work	Solitary work prevails			
		Working in teams prevails			
		Team work: • Open, project-dependent teams			
		• Stable teams			
		Team spirit: • Supportive			
		• Competitive			
		Team as source of pleasure and good feelings			
		Team as source of creativity			
		Other: **specify**			

CATEGORY	SUB CATEGORY	VARIABLES	APPLIES	DOES NOT APPLY	NO ANSWER
CULTURAL FACTORS	Gender	Feeling disadvantaged			
		Faced with prejudices			
		Seeing herself as different from men			
		Gendered division of tasks			
		Being in a male environment perceived as normal			
		Feels at ease in male environment			
		Problems with 'having to sell oneself'			
		Other: **specify**			
	Relationship to/image of technology/mathematics	Source of competence and high achievement			
		Source of creativity			
		'Natural' element of everyday life			
		Source of anxiety and feeling of incompetence			
		Other: **specify**			

LIFE THEMES	APPLIES	DOES NOT APPLY	NO ANSWER
Meeting challenges, accomplishing something			
Being creative and innovative			
Missed opportunities			
Fear of not doing well, having failed			
Doing something for myself			
Moving out from one's milieu, gaining status, a better life			
Being realistic			
Caring, contributing (e.g. to the team, to one's family, to the society)			
Getting ahead, having a career			
Seeing practical results			
Connecting: **specify**			

Annex 2C: frequencies – key data

Age, partners and children

age by country

	A	B	F	IRL	IT	P	UK	total
up to 30	6	4	9	6	6	5	2	38
31 to 40	6	10	7	7	7	6	5	48
41 to 50	3	1	1	1	2	4	6	18
over 50							2	2
missing				1				1
total	15	15	17	15	15	15	15	107

has a partner by country

	A	B	F	IRL	IT	P	UK	total
applies	7	10	13	14	14	12	9	79
does not apply	5	1	4		1	3	6	20
missing	3	4		1				8
total	15	15	17	15	15	15	15	107

number of children by country

	A	B	F	IRL	IT	P	UK	total
0	11	7	10	10	5	7	10	60
1	3	4	3	3	3	3	2	21
2	1	1	3	2	3	5	1	16
3		3	1				2	6
missing					4			4
total	15	15	17	15	15	15	15	107

category of children by country

	A	B	F	IRL	IT	P	UK	total
no children	11	7	10	10	5	7	10	60
small children (up to 14 years)	4	6	4	3	6	7	2	32
grown up children (15 years and older)		2	1			1	3	7
age of children missing			2	2				4
missing					4			4
total	15	15	17	15	15	15	15	107

family responsibilities and partners by country (n = 32 women with children up to 14 years)

	A	B	F	IRL	IT	P	UK	total
no partner		2				1	1	4
shared	3	2	2	3		1		11
partner: household	1	2	1			2	1	7
full responsibility			1		5	3		9
missing					1			1
total	4	6	4	3	6	7	2	32

Tasks and companies

tasks by country

	A	B	F	IRL	IT	P	UK	total
project management	3	7	3	3	2	4	4	26
developing	2	1	3	9	4	5		24
leading position	5	1	3	2		1	7	19
web design		2	5		4	2		13
support	3	4		1	1	1	2	12
marketing	2		2		2	2	2	10
teaching			1		2			3
total	15	15	17	15	15	15	15	107

branches by country

	A	B	F	IRL	IT	P	UK	total
telecommunication / Internet provider			2	2	1		4	9
software / consulting / systemhouse / ITservices	6	6	4	8	5	7	5	41
focus on hardware	1	3			2	2	1	9
web design		4	2	1	4	3	1	15
university / school / education in IT	5	1	1	2	2	1	1	13
non IT	3	1	7	1	1	2	3	18
branch missing			1	1				2
total	15	15	17	15	15	15	15	107

tasks and branches

	telecommunication / Internet provider	software / consulting / systemhouse / ITservices	focus on hardware	university / school / education in IT	web design	non IT	branch missing	total
project management	2	12	2	2	1	6	1	26
developing	3	12	1	4	1	2	1	24
leading position	1	7	4	4	2	1		19
web design		2			9	2		13
support		4	1	1	1	5		12
marketing / public and business relations	3	4	1		1	1		10
teaching				2		1		3
	9	41	9	13	15	18	2	107

self-employed by country (n = 11 women in self-employment)

	A	B	F	IRL	IT	P	UK	total
self-employed	3	1	2	1	2	1	1	11

changed to IT from non IT by country

	A	B	F	IRL	IT	P	UK	total
did not work in other area before	12	10	9	13	13	10	10	77
worked in other area before (not IT)	3	5	8	2	2	5	5	30
total	15	15	17	15	15	15	15	107

mobility in IT by country

	A	B	F	IRL	IT	P	UK	total
no change of job/employer	7	9	8	3	5	7	6	45
one change of job/employer	3	2	5	5	3	2	4	24
more than one change of job/employer	5	4	4	7	7	6	5	38
total	15	15	17	15	15	15	15	107

working hours by country

	A	B	F	IRL	IT	P	UK	total
under 35	2	2		1	2		1	8
35 to under 45	5	6	12	10	10	12	4	59
45 to under 60	2	7	5	1	1	2	7	25
60 and more	2			1			1	4
missing	4			2	2	1	2	11
total	15	15	17	15	15	15	15	107

crosstab: working hours / category of branch (user or ICT company*)

		two categories of working hours		Total
		under 45	45 and more	
category of branch: ICT or not	user company	13	5	18
	ICT company	39	16	55
Total		52	21	73

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0,011412 [b]	1	0,914927		
Continuity Correction [a]	0	1	1		
Likelihood Ratio	0,011466	1	0,914728		
Fisher's Exact Test				1	0,584619
Linear-by-Linear Association	0,011255	1	0,91551		
N of Valid Cases	73				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 5,18.

* user companies: all non IT companies
ICT companies: software/consulting/system house/IT services + telecommunication/Internet provider + focus on hardware
not included: university/school/education in IT + web design

Education and qualification

related initial training by country

	A	B	F	IRL	IT	P	UK	total
no related training	5	3	11	5	8	5	7	44
related specific training	10	12	6	9	7	10	8	62
missing				1				1
total	15	15	17	15	15	15	15	107

university degrees by country

	A	B	F	IRL	IT	P	UK	total
university degree in IT or related (3 missings)	5	9	3	8	7	9	7	48
university degree in informatics (3 missings)	3	3	2	4	3	2	3	20
university non IT (2 missings)	2	1	4	9	2	4	1	23

Annex 2D: frequencies and percentages – descriptive categories

Background (n=107 women)

home environment: countryside / city by country

	A	B	F	IRL	IT	P	UK	total
countryside	6	2		1	3	1	7	20
city	5	4	9	7	12	6	8	51
missing/no answer	4	9	8	7		8		36
total	15	15	17	15	15	15	15	107

home environment: small family / large family by country

	A	B	F	IRL	IT	P	UK	total
small family	6	4	9	4	4	4	9	40
large family	4	6	3	2	8	2	3	28
missing/no answer	5	5	5	9	3	9	3	39
total	15	15	17	15	15	15	15	107

home environment: growing up with boys by country

	A	B	F	IRL	IT	P	UK	total
applies	6	4	6	4	12	2	6	40
does not apply	3	6	6	2	2	2	6	27
missing/no answer	6	5	5	9	1	11	3	40
total	15	15	17	15	15	15	15	107

	frequencies			percentage			valid percent	
	countryside	city	no answer / missing	countryside	city	no answer / missing	countryside	city
home environment (childhood)	20	51	36	18,69	47,66	33,64	28,17	71,83

	frequencies			percentage			valid percent	
	large	small	no answer / missing	large	small	no answer / missing	large	small
family	28	40	39	26,17	37,38	36,45	41,18	58,82

	frequencies			percentage			valid percent	
	applies	does not apply	no answer / missing	applies	does not apply	no answer / missing	applies	does not apply
growing up with boys	40	27	40	37,38	25,23	37,38	59,70	40,30

career choice

	frequencies			percentage			valid percent	
	applies	does not apply	no answer / missing	applies	does not apply	no answer / missing	applies	does not apply
career choice								
independent/on their own	85	13	9	79,44	12,15	8,41	86,73	13,27
against expectations of the environment	19	65	23	17,76	60,75	21,50	22,62	77,38

	frequencies			percentage			valid percent	
	‚by chance'	focused	no answer / missing	‚by chance'	focused	no answer / missing	‚by chance'	focused
career choice	55	21	31	51,40	19,63	28,97	72,37	27,63

career choice: against expectations of the environment by country

	A	B	F	IRL	IT	P	UK	total
applies	3	2	3	3	3	2	3	19
does not apply	9	12	9	6	8	11	10	65
missing/no answer	3	1	5	6	4	2	2	23
total	15	15	17	15	15	15	15	107

technical background of parents by country (36 missings)

	A	B	F	IRL	IT	P	UK	total
father	4	3	3	1	1	1	1	14
mother				1		2		3
both parents			2		1			3
total	4	3	5	2	2	3	1	20

number of significant others by country

	A	B	F	IRL	IT	P	UK	total
0	3	3	1	2		5	2	16
1	5	5	8	8	7	8	8	49
2	2	4	1		8	1	1	17
some	2	3	5	3		1	1	15
missing/no answer	3		2	2			3	10
total	15	15	17	15	15	15	15	107

type of significant others by country (10 missings)

	A	B	F	IRL	IT	P	UK	total
family	9	13	4	6	16	9	5	62
teachers		4	3	5			3	15
friends		1	5		1	1	1	9
at work				2			2	4

experiences with significant others by country (10 missings)

	A	B	F	IRL	IT	P	UK	total
discouraging experiences	1	3	1	1	2		1	9
positive experiences								
father	1	4		1	5	5	1	18
mother	3	2		2	5	1	1	15
parents	2	1		1	3		1	8
siblings	1	1		2	3	2	1	10
other family members	1	3	3			1		8
teachers		3	3	4			4	14
friends		1	5		1	1	1	9
at work				2			2	4

type of positive experiences with significant others (10 missings)

	role model	providing computers/expertise	encouraging	total
father	11	6	11	18
mother	8	3	8	15
parents	1	2	7	8
siblings	6	5	7	10
other family members	2	2	6	8
teachers	1	5	14	14
friends	4	3	7	9
at work	2	1	4	4

motivations by country (7 missings)

	A	B	F	IRL	IT	P	UK	total
interesting field	10	3	9	10	12	9	9	62
salary	2	2		3		1	1	9
opportunity	4	6	3	3	5	3	1	25
other	3	6	4		2	2	2	19

Career path (n=107 women)

	frequencies			percentage			valid percent	
	applies	does not apply	no answer / missing	applies	does not apply	no answer / missing	applies	does not apply
ruptures/career breaks								
not having finished degree as career break	9	93	5	8,41	86,92	4,67	8,82	91,18
maternal leave	19	83	5	17,76	77,57	4,67	18,63	81,37
wrong career move	12	84	11	11,21	78,50	10,28	12,50	87,50
(not) getting promoted								
support from mentor	30	63	14	28,04	58,88	13,08	32,26	67,74
has to do everything herself	38	59	10	35,51	55,14	9,35	39,18	60,82
in a dead end position	17	77	13	15,89	71,96	12,15	18,09	81,91
steps ahead, plans for the future								
In terms of work:								
• have more to do with clients	34	43	30	31,78	40,19	28,04	44,16	55,84
• move into project coordination	36	46	25	33,64	42,99	23,36	43,90	56,10
• move into project acquisition	11	57	39	10,28	53,27	36,45	16,18	83,82
• more conceptual work	27	47	33	25,23	43,93	30,84	36,49	63,51
• more design activities	17	55	35	15,89	51,40	32,71	23,61	76,39
In terms of career steps:								
• gain a leading position	36	49	22	33,64	45,79	20,56	42,35	57,65
• change employer/company	29	53	25	27,10	49,53	23,36	35,37	64,63
• get self-employed	12	63	32	11,21	58,88	29,91	16,00	84,00
• go abroad	8	67	32	7,48	62,62	29,91	10,67	89,33
Requirements:								
• additional training	42	45	20	39,25	42,06	18,69	48,28	51,72
• longer hours of work	30	54	23	28,04	50,47	21,50	35,71	64,29
Constraints								
lack of career possibilities	20	70	17	18,69	65,42	15,89	22,22	77,78
higher positions not seen as attractive	26	62	19	24,30	57,94	17,76	29,55	70,45
lack of support	20	70	17	18,69	65,42	15,89	22,22	77,78
age	5	74	28	4,67	69,16	26,17	6,33	93,67
lack of degree	4	84	19	3,74	78,50	17,76	4,55	95,45

maternal leave as career break and number of women with children by country

	A	B	F	IRL	IT	P	UK	total
applies	1	2	5	5		1	5	19
does not apply	13	13	11	10	12	14	10	83
women with children	4	8	7	5	6	8	5	43

career breaks by task category

	support	web design	developing	marketing	project management	leading position	teaching	total
	2	3	1			3		9
not having finished degree	17%	23%	4%			16%		8%
		2	3	2	4	8		19
maternal leave		15%	13%	20%	15%	42%		18%
	1	2		2	4	3		12
wrong career move	8%	15%		20%	15%	16%		11%
total in task categories(100%)	12	13	24	10	26	19	3	107

(not) getting promoted by task category

	support	web design	developing	marketing	project management	leading position	teaching	total
	3	3	3	3	9	8	1	30
support from mentor	25%	23%	13%	30%	35%	42%	33%	28%
	3	6	8	3	10	7	1	38
has to do everything herself	25%	46%	33%	30%	38%	37%	33%	36%
	1	2	3		7	4		17
in a dead end position	8%	15%	13%		27%	21%		16%
total in task categories(100%)	12	13	24	10	26	19	3	107

plans in terms of career steps: change employer/company by country

	A	B	F	IRL	IT	P	UK	total
applies	1	11	2	5	1	2	7	29
does not apply	5	4	11	7	10	11	5	53
missing/no answer	9		4	3	4	2	3	25
total	15	15	17	15	15	15	15	107

requirements: additional training by country

	A	B	F	IRL	IT	P	UK	total
applies	5	4	11	3	2	12	5	42
does not apply	7	11	3	8	8	3	5	45
missing/no answer	3		3	4	5		5	20
total	15	15	17	15	15	15	15	107

requirements: longer hours of work by country

	A	B	F	IRL	IT	P	UK	total
applies		9		3	2	12	4	30
does not apply	11	6	10	9	9	3	6	54
missing/no answer	4		7	3	4		5	23
total	15	15	17	15	15	15	15	107

Personal life (n=107 women)

	frequencies			percentage			valid percent	
	applies	does not apply	no answer / missing	applies	does not apply	no answer / missing	applies	does not apply
living arrangement: alone	29	68	10	27,10	63,55	9,35	29,90	70,10
has a partner	79	20	8	73,83	18,69	7,48	79,80	20,20
Relationship with partner (n = 79 women)								
partner close to her field of work	38	25	16	48,10	31,65	20,25	60,32	39,68
supportive of her career	56	11	12	70,89	13,92	15,19	83,58	16,42
critical of her professional commitment	5	48	26	6,33	60,76	32,91	9,43	90,57

partner close to her field of work by country (n = 79 women)

	A	B	F	IRL	IT	P	UK	total
applies	3	5	5	9	6	7	3	38
does not apply	3	4	5	2	4	3	4	25
no answer/missing	1	1	3	3	4	2	2	16
total	7	10	13	14	14	12	9	79

partner critical of her professional commitment by country (n = 5 women)

	A	B	F	IRL	IT	P	UK	total
applies					2	3		5

Work situation (n=107 women)

	frequencies			percentage			valid percent	
	adequate / favourable	not adequate / unfavourable	no answer / missing	adequate / favourable	not adequate / unfavourable	no answer / missing	adequate / favourable	not adequate / unfavourable
salary	68	20	19	63,55	18,69	17,76	77,27	22,73
contract conditions	83	10	14	77,57	9,35	13,08	89,25	10,75

salary adequate / not adequate by country

	A	B	F	IRL	IT	P	UK	total
not adequate	1	4	3	1	6	1	4	20
adequate	8	11	11	13	9	8	8	68
no answer/missing	6		3	1		6	3	19
total	15	15	17	15	15	15	15	107

contract conditions favourable / unfavourable by country

	A	B	F	IRL	IT	P	UK	total
unfavourable	1	1	3	2	1		2	10
favourable	7	14	13	13	13	10	13	83
no answer/missing	7		1		1	5		14
total	15	15	17	15	15	15	15	107

salary adequate / not adequate and contract conditions favourable / unfavourable by task category

	support	web design	developing	marketing	project management	leading position	teaching	total
salary								
	5	4	3	1	5	2		20
not adequate	42%	31%	13%	10%	19%	11%		19%
	4	6	18	7	17	13	3	68
adequate	33%	46%	75%	70%	65%	68%	100%	64%
contract conditions								
	2	1	1	2	2	2		10
unfavourable	17%	8%	4%	20%	8%	11%		9%
	9	10	21	5	20	15	3	83
favourable	75%	77%	88%	50%	77%	79%	100%	78%
total in task categories(100%)	12	13	24	10	26	19	3	107

crosstab: salary / contract conditions

		contract conditions		
		unfavourable	favourable	total
salary	not adequate	5	12	17
	adequate	4	62	66
	total	9	74	83

	frequencies			percentage			valid percent	
	applies	does not apply	no answer / missing	applies	does not apply	no answer / missing	applies	does not apply
quality of working conditions								
flexible working time	52	37	18	48,60	34,58	16,82	58,43	41,57
high levels of stress	38	52	17	35,51	48,60	15,89	42,22	57,78
high work loads	57	34	16	53,27	31,78	14,95	62,64	37,36
high level of discretion/freedom	68	27	12	63,55	25,23	11,21	71,58	28,42
total availability required	33	47	27	30,84	43,93	25,23	41,25	58,75
tasks - responsibilities								
can deploy her skills/competencies	96	8	3	89,72	7,48	2,80	92,31	7,69
has opportunity for learning	89	13	5	83,18	12,15	4,67	87,25	12,75
role overload/too difficult work assignments	11	80	16	10,28	74,77	14,95	12,09	87,91
cooperation at work								
solitary work prevails	36	52	19	33,64	48,60	17,76	40,91	59,09
working in teams prevails	74	20	13	69,16	18,69	12,15	78,72	21,28
team work:								
• open, project-dependent teams	48	28	31	44,86	26,17	28,97	63,16	36,84
• stable teams	37	30	40	34,58	28,04	37,38	55,22	44,78
team spirit:								
• supportive	63	21	23	58,88	19,63	21,50	75,00	25,00
• competitive	13	45	49	12,15	42,06	45,79	22,41	77,59
team as source of pleasure and good feelings	44	25	38	41,12	23,36	35,51	63,77	36,23
team as source of creativity	32	33	42	29,91	30,84	39,25	49,23	50,77

crosstab: high levels of stress / caring for children

		caring for children		total
		does not apply	has small children (up to 14)	
high levels of stress	applies	23	15	38
	does not apply	40	12	52
total	Count	63	27	90

crosstab: high work loads / caring for children

		caring for children		total
		does not apply	has small children (up to 14)	
high work loads	applies	35	22	57
	does not apply	28	6	34
total		63	28	91

tasks and responsibilities by task category

	support	web design	developing	marketing	project management	leading position	teaching	total
can deploy her skills/competencies	10	12	22	10	25	15	2	96
	83%	92%	92%	100%	96%	79%	67%	90%
has opportunity for learning	11	12	21	8	20	15	2	89
	92%	92%	88%	80%	77%	79%	67%	83%
role overload/too difficult work assignments	1	1	2		5	2		11
	8%	8%	8%		19%	11%		10%
total in task categories(100%)	12	13	24	10	26	19	3	107

can deploy her skills/competencies by country

	A	B	F	IRL	IT	P	UK	total
applies	13	15	17	14	12	14	11	96
does not apply				1	3	1	3	8
no answer/missing	2						1	3
total	15	15	17	15	15	15	15	107

has opportunity for learning by country

	A	B	F	IRL	IT	P	UK	total
applies	15	13	14	12	13	14	8	89
does not apply		2	1	3	2	1	4	13
no answer/missing			2				3	5
total	15	15	17	15	15	15	15	107

role overload / too difficult work assignments by country

	A	B	F	IRL	IT	P	UK	total
applies		1		1		6	3	11
does not apply	15	14	11	11	11	8	10	80
no answer/missing			6	3	4	1	2	16
total	15	15	17	15	15	15	15	107

Cultural factors (n=107 women)

	frequencies			percentage			valid percent	
	applies	does not apply	no answer / missing	applies	does not apply	no answer / missing	applies	does not apply
Gender								
feeling disadvantaged	30	67	10	28,04	62,62	9,35	30,93	69,07
faced with prejudices	28	69	10	26,17	64,49	9,35	28,87	71,13
seeing herself as different from men	42	52	13	39,25	48,60	12,15	44,68	55,32
gendered division of tasks	26	64	17	24,30	59,81	15,89	28,89	71,11
being in a male environment perceived as normal	60	32	15	56,07	29,91	14,02	65,22	34,78
feels at ease in male environment	66	24	17	61,68	22,43	15,89	73,33	26,67
problems with 'having to sell oneself'	13	64	30	12,15	59,81	28,04	16,88	83,12
Relationship to/image of technology/mathematics								
source of competence and high achievement	73	17	17	68,22	15,89	15,89	81,11	18,89
source of creativity	53	29	25	49,53	27,10	23,36	64,63	35,37
'natural' element of everyday life	59	19	29	55,14	17,76	27,10	75,64	24,36
source of anxiety and feeling of incompetence	8	80	19	7,48	74,77	17,76	9,09	90,91

crosstab: growing up with boys / being in a male environment perceived as normal

		being in a male environment perceived as normal		Total
		applies	does not apply	
growing up with boys	applies	22	10	32
	does not apply	16	8	24
Total		38	18	56

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0,02729 [b]	1	0,868788		
Continuity Correction [a]	0	1	1		
Likelihood Ratio	0,02725	1	0,868885		
Fisher's Exact Test				1	0,547182
Linear-by-Linear Association	0,026803	1	0,869954		
N of Valid Cases	56				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,71.

crosstab: seeing herself as different from men / 2 categories of age

		2 categories of age		Total
		up to 35	36 and older	
seeing herself as different from men	applies	20	21	41
	does not apply	35	17	52
Total		55	38	93

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,256444 [b]	1	0,071143		
Continuity Correction [a]	2,534866	1	0,111356		
Likelihood Ratio	3,260902	1	0,07095		
Fisher's Exact Test				0,090442	0,055664
Linear-by-Linear Association	3,221429	1	0,07268		
N of Valid Cases	93				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 16,75.

crosstab: feeling disadvantaged / faced with prejudices

		faced with prejudices		Total
		applies	does not apply	
feeling disadvantaged	applies	18	11	29
	does not apply	8	57	65
Total		26	68	94

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	24,81646 [b]	1	6,31E-07		
Continuity Correction [a]	22,39183	1	2,22E-06		
Likelihood Ratio	23,87784	1	1,03E-06		
Fisher's Exact Test				1,74E-06	1,74E-06
Linear-by-Linear Association	24,55246	1	7,23E-07		
N of Valid Cases	94				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 8,02.

crosstab: faced with prejudices / gendered division of tasks

		gendered division of tasks		Total
		applies	does not apply	
faced with prejudices	applies	9	13	22
	does not apply	12	49	61
Total		21	62	83

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,858374 [b]	1	0,049498		
Continuity Correction	2,816518	1	0,093299		
Likelihood Ratio	3,63533	1	0,056565		
Fisher's Exact Test				0,083488	0,049444
Linear-by-Linear Association	3,811887	1	0,05089		
N of Valid Cases	83				

a Computed only for a 2x2 table

b 0 cells (,0%) have expected count less than 5. The minimum expected count is 5,57.

being in a male environment perceived as normal by country

	A	B	F	IRL	IT	P	UK	total
applies	3	13	10	11	9	9	5	60
does not apply	10	2	1	2	4	6	7	32
no answer/missing	2		6	2	2		3	15
total	15	15	17	15	15	15	15	107

feels at ease in male environment by country

	A	B	F	IRL	IT	P	UK	total
applies	3	14	11	11	10	9	8	66
does not apply	6	1		1	4	6	6	24
no answer/missing	6		6	3	1		1	17
total	15	15	17	15	15	15	15	107

technology as source of creativity by country

	A	B	F	IRL	IT	P	UK	total
applies	6	3	10	8	7	12	7	53
does not apply	7	9		3	6	1	3	29
no answer/missing	2	3	7	4	2	2	5	25
total	15	15	17	15	15	15	15	107

technology as ‘natural’ element of everyday life by country

	A	B	F	IRL	IT	P	UK	total
applies	4	11	5	8	10	13	8	59
does not apply	8	1	4		4		2	19
no answer/missing	3	3	8	7	1	2	5	29
total	15	15	17	15	15	15	15	107

technology as source of anxiety by country

	A	B	F	IRL	IT	P	UK	total
applies		1		2		4	1	8
does not apply	11	14	10	10	13	10	12	80
no answer/missing	4		7	3	2	1	2	19
total	15	15	17	15	15	15	15	107

gender by task category (selected variables)

	support	web design	developing	marketing	project management	leading position	teaching	total
seeing herself as different from men	6	4	5	4	9	13	1	42
	50%	31%	21%	40%	35%	68%	33%	39%
being in a male environment perceived as normal	7	8	18	5	15	5	2	60
	58%	62%	75%	50%	58%	26%	67%	56%
problems with 'having to sell oneself'		1	3		7	2		13
		8%	13%		27%	11%		12%
total in task categories(100%)	12	13	24	10	26	19	3	107

relationship to/image of technology/mathematics by task category (selected variables)

	support	web design	developing	marketing	project management	leading position	teaching	total
source of creativity	3	9	12	6	12	9	2	53
	25%	69%	50%	60%	46%	47%	67%	50%
source of anxiety and feeling of incompetence		1	2		3	2		8
		8%	8%		12%	11%		7%
total in task categories(100%)	12	13	24	10	26	19	3	107

Annex 2E: cluster analysis

Table 1: variables considered in the cluster analysis (28 binary variables)

3 categories of age *[1]	under 30
	31 to 40
	41 and older
6 categories of tasks *[1]	support / administration / helpdesk
	web design + graphic designer / journalist
	developing / programming / technical writing
	marketing / public and business relations
	project management + head of internal department
(the category of teaching was not used as it comprises only 3 women)	leading position / university + single-person company in IT consulting
other key data *[1]	working in a large company
	caring for children (having one or more children up to 14 years old)
	related specific training
	university in non IT subject
	university degree in IT or related
	mobility in IT (more than one change of job/employer)
background *[2]	growing up with boys
	career choice 'by chance'
career path *[2]	support from mentor
	lack of career possibilites
	higher positions not seen as attractive
personal life *[2]	partner close to her field of work
	supportive partner
work situation *[2]	salary not adequate
	no flexible working time
	high levels of stress
	team as source of pleasure
cultural factors *[2]	feeling disadvantaged
	technology as source of competence and high achievement

*[1] ... coded from the data provided in the key data sheet *[2] ... see coding scheme

Table 2: frequencies for variables used in the cluster analysis (final version)

Rogers and Tanimoto distance measure, Complete Linkage method									
Cluster nr.	1	2	3	4	5	6	7	8	total
	Chance careers	Open careers with strong IT background	Consolidated careers	Women in leading positions	Reorientation careers	Mobile careers	Low hierarchy jobs	Good careers with some constraints	
under 30	13	20	1			3		1	38
31 to 40	1	2	14	3	7	9	4	8	48
41 and older	6	2		10	1		1		20
support	2	4				1	3	2	12
web design	6	1			3	3			13
developing	5	7	1	1	1	3	2	4	24
marketing	1	3	1	1	2	1		1	10
project management	3	5	9	5	2	2			26
leading position	2	4	3	6		2		2	19
large company	8	10	11	9	1	3	2	7	51
caring for children	2	1	5	8	5	6	2	3	32
related specific training		21	15	8	1	5	3	9	62
university in non IT subject	6	2		2	7	2		4	23
university degree in IT or related		15	13	8		3	2	7	48
mobility in IT	4	8	4	5	3	11		3	38
growing up with boys	11	6	9	3		5	1	5	40
career choice 'by chance'	11	11	6	8	6	9	5		56
support from mentor	6	10	5	6				3	30
lack of career possibilites	5	3	2	1	1	3		5	20
higher positions not seen as attractive	4	3	7	2	1	5		4	26
partner close to her field of work	6	4	3	10	1	8		6	38
supportive partner	6	11	8	12	3	11	1	4	56
salary not adequate	5	3	1		1	6	2	2	20
no flexible working time	7	7	3	1	4	3	5	7	37
high levels of stress	7	4	6	9	2	5	1	4	38
team as source of pleasure	8	16	6	6		5	3		44
feeling disadvantaged	2	4	2	4	1	7	5	5	30
technology as source of competence and high achievement	16	18	12	10	5	1	1	10	73
total	20	24	15	13	8	12	5	10	107

Table 3: frequencies for variables used in the cluster analysis (with Jaccard distance)

Jaccard distance measure, Complete Linkage method									
Cluster nr.	1	2	3	4	5	6	7	8	total
under 30	9		1	2	16			10	38
31 to 40	3	20	10	12			2	1	48
41 and older	4	8		1		2	5		20
support			1	5	3		1	2	12
web design			6		2		3	2	13
developing	6	6		5	5			2	24
marketing	4	3		3					10
project management	5	12	2		3			4	26
leading position	1	7	1	2	3	2	3		19
large company	12	25	3	3	6			2	51
caring for children	4	13	8	2	1		3	1	32
related specific training	6	27	3	9	8	2		7	62
university in non IT subject	9	3	4	3	4				23
university degree in IT or related	3	27	3	5	4	2		4	48
mobility in IT	2	10	8	6	3	1	3	5	38
growing up with boys	4	10	4	4	8		6	4	40
career choice 'by chance'	11	9	4	13	9		5	5	56
support from mentor	4	9	2	2	4	1	3	5	30
lack of career possibilites	1	4	6	1	6			2	20
higher positions not seen as attractive	2	11	1	4	2	1	1	4	26
partner close to her field of work	4	16	6	5	2		1	4	38
supportive partner	5	18	11	6	4		3	9	56
salary not adequate	3	2	5	5	3		1	1	20
no flexible working time	5	7	5	7	12		1		37
high levels of stress	7	13	3	6	2		4	3	38
team as source of pleasure	7	12	1	9	12		2	1	44
feeling disadvantaged	1	6	6	9	1			7	30
technology as source of competence and high achievement	16	25	3	4	9	1	5	10	73
total	16	29	11	15	16	2	7	11	107

Annex 2F: frequencies – key data for male informants

Age, partners and children

age by country (male informants)

	A	B	F	IRL	IT	P	UK	total
up to 30		1			1	1		3
31 to 40	3	2	3	5	3	3	2	21
41 to 50		1	1		1		2	5
over 50	1	1					1	3
missing	1							1
total	5	5	4	5	5	4	5	33

has a partner by country (male informants)

	A	B	F	IRL	IT	P	UK	total
applies	4	4	3	5	5	3	3	27
does not apply	1	1	1				2	5
missing						1		1
total	5	5	4	5	5	4	5	33

number of children by country (male informants)

	A	B	F	IRL	IT	P	UK	total
0	1	1	1	4	1	1	2	11
1	1		3	1	3	2		10
2	2	3					2	7
3		1			1		1	3
missing	1					1		2
total	5	5	4	5	5	4	5	33

category of children by country (male informants)

	A	B	F	IRL	IT	P	UK	total
no children	1	1	1	4	1	1	2	11
small children (up to 14 years)	3	1	3	1	4	2	1	15
grown up children (15 years and older)		2					2	4
age of children missing		1						1
missing	1					1		2
total	4	5	4	5	5	4	5	33

Tasks and companies

tasks by country (male informants)

	A	B	F	IRL	IT	P	UK	total
leading position	4	2	1	1	1	2	3	14
developing		1		3	1	2	1	8
project management	1	1	1		2		1	6
marketing			2	1				3
web design		1			1			2
support								0
teaching								0
total	5	5	4	5	5	4	5	33

branches by country (male informants)

	A	B	F	IRL	IT	P	UK	total
telecommunication / Internet provider			2	3	1			6
software / consulting / systemhouse / ITservices	3	4	1	1	1	4	1	15
focus on hardware		1			1		1	3
web design					1			1
university / school / education in IT			1					1
non IT	2			1	1		3	7
total	5	5	4	5	5	4	5	33

self-employed by country (n = 9 men in self-employment)

	A	B	F	IRL	IT	P	UK	total
self-employed	3	1			2	1	2	9

changed to IT from non IT (male informants)

	A	B	F	IRL	IT	P	UK	total
did not work in other area before	4	3	2	5	4	3	3	24
worked in other area before (not IT)	1	2	2		1	1	2	9
total	5	5	4	5	5	4	5	33

mobility in IT (male informants)

	A	B	F	IRL	IT	P	UK	total
no or one change of job/employer	4	2	1	2	4	4	1	18
more than one change of job/employer	1	3	3	3	1		4	15
total	5	5	4	5	5	4	5	33

Education and qualification

related training (male informants)

	A	B	F	IRL	IT	P	UK	total
no related training	2	1	2	2	1		2	10
related specific training	3	4	2	3	4	4	3	23
total	5	5	4	5	5	4	5	33

university degrees (n = 17 / 5)

	A	B	F	IRL	IT	P	UK	total
university degree in IT or related	3	1	1	2	4	3	3	17
university non IT		1	1	1	1		1	5